Applying the Limits of Acceptable Change Process to Visitor Impact Management in New Zealand's Natural Areas:

A case study of the Mingha-Deception Track, Arthur's Pass National Park.

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Abstract

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This thesis has the dual aims of analysing methods appropriate for applying the Limits of Acceptable Change (LAC) planning process to New Zealand's natural areas, and investigating visitor use issues and impacts for the Mingha-Deception track in Arthur's Pass National Park, New Zealand. Limits of Acceptable Change planning has the potential to be a useful tool for the management of natural areas in New Zealand as it provides a structured process for outlining the desired conditions for a natural area. The three-stage LAC implementation method used in this study involved: i) the participation of stakeholders to identify the values, issues and concerns; ii) the measurement of visitor impacts currently occurring; and iii) the involvement of stakeholders in setting acceptability levels for visitor impacts.

The Mingha-Deception track was chosen as the site to investigate the LAC process due to issues surrounding the possible impacts of runners training for and participating in the Coast-to-Coast multi-sport event on other track users, along with

issues regarding the impacts associated with growing visitor use of the track. This research focuses on the social impacts and visitor perceptions of biophysical impacts associated with visitor use of the Mingha-Deception track.

The social and perceived biophysical impacts on the Mingha-Deception track most commonly reported by visitors included crowding, displacement (including possible future displacement), being bothered by track widening, the need for more directional signage, tracks/boardwalks and toilets on the track, and a negative view of the standard of facilities. Of these, the only impact to clearly exceed the acceptability level set for it by stakeholders was 'visitors who thought more directional signage was needed on the track'. Although conflict and the percentage of visitors being bothered by vegetation damage and human toilet waste were impacts reported by low levels of visitors, these impacts were all close to their acceptability levels.

This thesis offers a critique of the methods used in this study of the Mingha-Deception track, compares them with those of other New Zealand LAC-type studies, and outlines a three-stage method appropriate for applying LAC in the New Zealand situation. Important features in this method are the inclusion of representatives from all stakeholder types for an area, involving sufficient numbers of stakeholders in setting acceptability levels and ensuring stakeholders understand the process in which they are participating.

Keywords: Limits of Acceptable Change, visitor impact management, natural areas, stakeholder participation, New Zealand conservation estate, social impacts, perceived biophysical impacts, Mingha-Deception track.

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Chapter 1: Introduction

1.1 INTRODUCTION

This thesis focuses on the important question: how is it decided what levels of visitor-induced change and impact are acceptable and appropriate in natural areas? This question is investigated through a case study using a method based on the Limits of Acceptable Change (LAC) planning framework to include stakeholders in deciding what levels of social and perceived biophysical visitor impacts are acceptable for the Mingha-Deception track in Arthur's Pass National Park. Issues surrounding visitor use of the Mingha-Deception track, and the impact levels occurring on the track, are examined as part of this process. This chapter begins by introducing the issues surrounding visitor use and impacts in New Zealand's natural areas (section 1.2). The LAC planning framework is then introduced (section 1.3), before the specific aims and objectives of this research are outlined (section 1.4). Next, it outlines the research methods (section 1.5), the contribution this study makes to understanding visitor use issues and impacts on the Mingha-Deception track, and the knowledge surrounding the LAC process (section 1.6). The chapter concludes with an overview of the content and presentation of this thesis (section 1.7).

1.2 VISITOR USE AND IMPACT IN NEW ZEALAND'S NATURAL AREAS

New Zealanders have a long-standing relationship with the natural environment, as evidenced by the 14 national parks and numerous other protected natural areas that have been created in this country. New Zealanders have always had free and easy access to these areas (Kearsley, Russell, Croy & Mitchell, 2001) and many value the recreation opportunities they provide. The importance of public access to natural

areas is recognised in legislation. The National Parks Act 1980, for example, specifies that the purpose of national parks is not only to preserve natural features and protect native species and cultural heritage, but also to provide for the "benefit, use and enjoyment of the public" (Section 43, National Parks Act 1980). The right to visit and enjoy protected natural areas is clearly an important part of New Zealand's culture.

Protected natural areas are also pivotal to New Zealand's tourism industry. *Towards 2010: Implementing the New Zealand Tourism Strategy* refers to the conservation estate as the "jewel in New Zealand tourism's crown" (Ministry of Tourism, 2003, p.18). There has been constant growth in international visitor numbers to New Zealand over the last four decades (Tourism Industry Association New Zealand, 2005) and the majority of visitors to New Zealand visit natural areas (Ministry of Tourism, 2006). As visitor numbers continue to rise, visitor numbers in natural areas must therefore also increase. The large numbers of visitors who spend time viewing scenery or participating in recreation activities indicate the importance of the environment to New Zealand's tourism product.

The management of the national parks and other public conservation lands, on which much of New Zealand's tourism is based, is the responsibility of the Department of Conservation. This central government agency faces the challenge not only of protecting the natural environment but also of providing for public use in an appropriate and acceptable way. The importance of appropriate management of recreation in protected natural areas has been highlighted in recent years, due to

concerns about negative impacts from increasing recreational use of these areas (Department of Conservation, 1996; Coughlan & Kearsley, 1996).

Issues surrounding negative visitor impacts and appropriate use of protected natural areas have been raised, not only in the context of increasing visitor numbers, but also due to changing recreation patterns and activities in these areas. Specifically, there has been concern over the impacts of relatively new activities such as mountain biking, mountain running and multi sport events, like the Speight's Coast-to-Coast and the Kepler Challenge, on national parks (Corbett, 1995; Espiner & Simmons, 1998). These issues raise questions about what activities are appropriate in national parks and must be considered when managing for visitor impacts in these areas.

In New Zealand, many studies have shown that both biophysical and social impacts (such as crowding, conflict and displacement) occur to some degree in this country's natural areas (Coughlan & Kearsley, 1996; Hawke, 2000; Horn, 1994; Kazmierow, 1996; Kearsley, 1997; Sharpe, 1999). Biophysical impacts in natural areas relate to undesirable impacts of visitor use and include things such as the degradation and disturbance of soils, vegetation, water resources and wildlife (Hammitt & Cole, 1998). Social impacts include things such as crowding and conflict and are dependent on the number, frequency and type of other visitors encountered during a recreation experience (Eagles & McCool, 2002). Encounters with or evidence of others during recreation experiences are not necessarily negative, but if such encounters or evidence of others should disturb a recreationist then this contact can be considered a negative social impact. The challenge currently facing managers is not to determine whether social impacts are occurring but to decide what levels of impact are acceptable or

justifiable. This thesis aims to contribute to the knowledge of how levels of acceptability can be established for visitor impacts in natural areas.

1.3 THE LIMITS OF ACCEPTABLE CHANGE PLANNING FRAMEWORK

Limits of Acceptable Change is a visitor management planning framework which aims to decide how much visitor-induced change in a natural area is acceptable. The process also allows for the management of visitor impact conditions within acceptable levels. An important part of the LAC process is the involvement of stakeholders in outlining a set of values and concerns regarding visitor use of a natural area, as well as specifying what conditions are acceptable for an area. The LAC process developed from the carrying capacity model for recreation planning, which focused on numbers of users in natural areas and was based on the idea that a given area could only withstand a certain amount of use before the quality of both the user's experience and the natural environment diminished (Hendee & Dawson, 2002). This concept has proved insufficient to explain visitor impacts in natural areas, as the relationship between use and impact is not clear-cut (Eagles & McCool, 2002; Hendee & Dawson, 2002). Rather than focusing on limiting visitor numbers, the LAC process accepts that change will occur in natural areas with visitor use, and focuses on the appropriate and acceptable level of this change (Hendee & Dawson, 2002).

The LAC process has received considerable attention in international recreation planning literature as well as in several New Zealand studies. It is a process that may be an appropriate visitor management tool for natural areas in New Zealand as it allows for the specification by stakeholders of values and desired conditions for an area as well as a process for developing levels of acceptability of these conditions.

Appropriate methods for applying LAC as a visitor impact management tool for New Zealand's natural areas are investigated in this study.

1.4 AIMS AND OBJECTIVES

The research has two interrelated aims. First, it aims to develop a LAC-type methodology, which includes stakeholder contributions to decisions about what levels of visitor impacts are acceptable, and assess the usefulness of this method and the LAC process for visitor impact management in New Zealand's protected natural areas. This aim is addressed through the review of the LAC type methodology applied to a case study of the Mingha-Deception track in Arthur's Pass National Park. Second, this research aims to investigate issues surrounding visitor use of the Mingha-Deception track and measure the social impacts currently occurring on the track. Through the application of the LAC process, it will be determined whether these impacts fall within currently acceptable levels. Actual biophysical impacts on the track were not assessed due to time constraints and the focus on social aspects in this research. However visitors' perceptions of biophysical impacts were measured, as these affect their satisfaction with their experience on the Mingha-Deception track. The specific objectives that were investigated are listed below.

Objectives:

1) To identify stakeholders for the Mingha-Deception track.
2) To identify and describe stakeholder values, issues and concerns for the Mingha-Deception track.
3) To identify measurable indicators of social and perceived biophysical conditions for the Mingha-Deception track.

4) To measure the status of social and perceived biophysical indicators on the Mingha-Deception track.
5) To assess the stakeholder acceptance of current conditions for the Mingha-Deception track as measured by the indicators.
6) To explore the utility of the methods applied in this research and the Limits of Acceptable Change framework as a visitor impact management tool for New Zealand's natural areas.

1.5 RESEARCH METHODS

This study uses a three-stage method of applying the LAC process to investigate acceptability levels for social and perceived biophysical visitor impacts on the Mingha-Deception track. In the first stage, stakeholders are interviewed to identify the range of values, issues and concerns held regarding visitor use of the track. The information gained in this stage will inform the development of the remainder of the process. Stage two involves a survey of visitors to the Mingha-Deception track to establish the visitor impact conditions on the track. In stage three, a survey of stakeholders measures stakeholder acceptability of impact conditions. Stakeholder acceptability levels are then compared with measured impact conditions for the Mingha-Deception track, to assess the acceptability of impact levels currently occurring on the track.

The method of applying the LAC process in this study is critiqued and compared with methods used in other New Zealand LAC-type studies. Through this review and critique, methods appropriate for applying the LAC process to natural area management in New Zealand are analysed.

1.6 CONTRIBUTION OF RESEARCH

At a local level, this research will add to the body of knowledge about visitor use of the Mingha-Deception track, contribute to the understanding of the social and perceived biophysical impact conditions that exist on the track, and identify those the stakeholders view as desirable. The information gained from this research will be useful in the ongoing management of visitor impacts on the track.

At a wider scale, this research will add to the understanding of how the LAC process can be effectively applied to the management of visitor impacts in national parks and protected natural areas. Important to this is the development of methods for including relevant stakeholders in outlining a set of values, issues and concerns, and in determining levels of acceptability for visitor impacts for a natural area.

1.7 THESIS ORGANISATION

This chapter is the first of nine in this thesis. Chapter 2 reviews the literature surrounding social impacts in natural areas, introduces and discusses the LAC framework and the application of the process in New Zealand. Chapter 3 introduces the study site (the Mingha-Deception track) and discusses issues surrounding visitor use of the track. In Chapter 4 the methods used to collect and analyse data in the research are outlined. Chapters 5, 6, and 7 are structured around the three-phase LAC process, and present and discuss the results of each stage of the data collection relating to visitor use and impact on the Mingha-Deception track. Chapter 5 outlines the values, issues and concerns of stakeholders regarding visitor use of the track. Chapter 6 presents and discusses the results of visitor surveys undertaken to measure visitor impacts on the track. Chapter 7 outlines the levels of stakeholder acceptability

of impact conditions on the track, and compares them with impact levels currently occurring. In chapter 8, the methods of applying the LAC process in this study are critiqued and compared with other New Zealand LAC studies in order to outline an appropriate method of applying the LAC process in the New Zealand situation. Chapter 9 draws together the main arguments of this thesis.

Chapter 2: Literature Review

2.1 INTRODUCTION

The purpose of this chapter is to review the literature on the social impacts of visitors in natural areas, and introduce the Limits of Acceptable Change planning framework for managing these impacts. This review of the literature will provide the theoretical context for the study of social impacts in natural areas, as well as a platform for discussing and understanding the LAC planning framework and its application in New Zealand. The chapter begins by discussing social impacts in natural area recreation (section 2.2). The carrying capacity concept and the LAC planning framework are then introduced and discussed (sections 2.3 and 2.4). Next, applications of the LAC framework in New Zealand are outlined (section 2.5). Section 2.6 summarises the discussion in this chapter and outlines the role of the current study in providing a method of managing for acceptable visitor impacts in New Zealand's natural areas.

2.2 SOCIAL IMPACTS AND COPING MECHANISMS

The impacts of increasing numbers of visitors in the natural environments they visit have been a concern to park managers for several decades. From the 1960s and 1970s a large body of research has been established, largely in North America, regarding the social impacts of visitors in natural areas and how to manage these impacts. More recently, research regarding social impacts in New Zealand has increased in response to concerns about visitor use and impact in natural areas. This section provides an overview of the social impacts that occur in outdoor recreation and the models and theories through which they are understood and managed, with examples of both international and local research findings.

2.2.1 Crowding

Crowding is considered one of the more serious negative social impacts in outdoor recreation (Coughlan & Kearsley, 1996). Studies from North America and New Zealand have shown that crowding occurs to various degrees in both places (Corbett, 2001; Coughlan & Kearsley, 1996; Ditton, Felder & Graefe, 1983; Higham, Kearsley & Thyne, 1996; Manning & Valliere, 2001; Sharpe, 1999; Vaske, Donnelly & Heberlein, 1980). These studies emphasise that crowding perceptions are influenced by many factors other than simply the number of users encountered.

Manning (1999) discussed three main variables contributing to crowding perceptions: the personal characteristics of the visitor, the characteristics of other visitors encountered, and situational variables. The personal characteristics of the visitor include motivations for recreation, expectations and preferences for encounters, and attitudes towards management. The characteristics of other visitors encountered include the type and size of groups, the behaviour of others and the perceptions of alikeness between visitors. Situational variables refers to contributing factors such as the type of area (for example, wilderness versus front country), location within an area (for example, track end or remote location) and environmental factors like the spatial design of an area (which may affect things such as numbers of encounters). Stankey (1989) added evidence of others as another factor affecting perceptions of crowding. This suggests that crowding can occur, even when encounters do not, where there is evidence (for example track damage, vegetation damage and litter) of other users.

Many of the variables outlined above have been shown to relate to crowding levels. For example, studies by Vaske et al., (1980), Ditton et al., (1983) and Coughlan & Kearsley (1996) showed that the level of previous experience of the recreationist is a significant factor affecting crowding levels. Their studies showed that more experienced recreationists are likely to have greater perceptions of crowding than those with less experience. Sharpe (1999) and Kearsley (1997) found that users are disturbed by the behaviour of, and perceived differences between, themselves and other users. Results of a study of visitors on New Zealand's Great Walks network, (Cessford, 1997a, b, c, d, e, f, g; Cessford, 1998a, b, c, d), found that crowding perceptions are influenced by a number of factors. For example, results for the Kepler Track showed that those who encountered more other users than they had expected perceived higher levels of crowding.

Location on the track also proved to be an important variable influencing crowding perceptions, as significantly more visitors mentioned huts as places they felt crowded, compared with other parts of the track (Cessford, 1997b). In their survey of trampers in New Zealand over the 1995/1996 summer, Higham et al., (1996) also found that perceptions of crowding varied according to location on the track. Their study found huts (as well as track and sightseeing areas) to be specific sites of crowding. The study also showed that large groups could affect crowding perceptions, with some respondents indicating that they felt some groups (particularly in huts) were too large (Higham et al.,, 1996). An understanding of the nature and extent of crowding in protected natural areas helps to identify the factors that contribute to negative visitor impacts in natural areas.

2.2.2 Conflict

Conflict in outdoor recreation has been the subject of much social impact research and there are several models for understanding this conflict. Bury, Holland and McEwen (1983), for example, link conflict with three characteristics: dependence on technology, dominance over nature, and the proximity of different activities. Likewise, Devall and Harry (1981) suggest that recreation technologies are important and users of 'less obtrusive' technologies are likely to resent users of 'more obtrusive' technologies. While it seems obvious that some activity styles may be considered more obtrusive than others (for example, motorised versus non-motorised users) this theory does raise questions about what is considered obtrusive. The theories of Devall and Harry (1981) and Bury et al., (1983) provided a useful understanding of some aspects of conflict; however these do not fully explain the concept.

Jacob and Schreyer's (1980) model of goal interference is commonly cited in outdoor recreation literature (see Blahna, Smith & Anderson, 1995; Manning, 1999; Ramthun, 1995) and provides an extended basis for understanding recreational conflict. Goal interference suggests recreation is directed by specific goals and when those goals are compromised, conflict results (Schreyer, 1990). Considering the concept of goal interference, Jacob & Schreyer (1980) suggested several major dynamics affecting conflict. First, the activity style is important. Different people may ascribe different meanings to the same activity and vary in the behaviours they believe are appropriate in carrying it out. Second, people develop relationships with the environments they visit and these place attachments will influence their perceptions of, and sensitivity to, activities carried out within that place. Third, the mode of experience is important. The environment may be perceived as an integral part of the experience or simply as a

backdrop and this often results in conflict, for example, between motorised and non-motorised users. Finally, users of the outdoors come from a diverse range of lifestyles, have different tolerance levels for people different from themselves and therefore have varying perceptions of what is appropriate in recreational settings.

Four types of conflict in outdoor recreation settings can be identified (Manning, 1999; Schreyer, 1990). Intra-activity conflict occurs with differences in behaviours and styles of participation within an activity (Todd & Graefe, 1989). Interactivity conflict occurs between different types of users of a recreation setting (Schreyer, 1990). Conflicts can occur between outdoor recreationists and resource managers (Clark, Hendee & Campbell, 1971). Finally there can be conflict between outdoor recreationists and other users of the resource, for example, recreational and commercial fishers (McAvoy, Gramann, Burdge & Absher, 1986).

Manning's (1999, p.202) expanded model of conflict (see figure 2.1) provides an extensive understanding of the factors and processes involved in recreational conflict. This model incorporates the four factors suggested by Jacob and Schreyer (1980), and indicates that these determine a recreationist's sensitivity to conflict. When a person's goals are interfered with, conflict results. This may be one of the four types of conflict suggested by Manning (1999) and Schreyer (1990) and will lead to diminished satisfaction with the recreation experience. The recreationist may employ coping behaviours (see section 2.2.3) to deal with the negative experience.

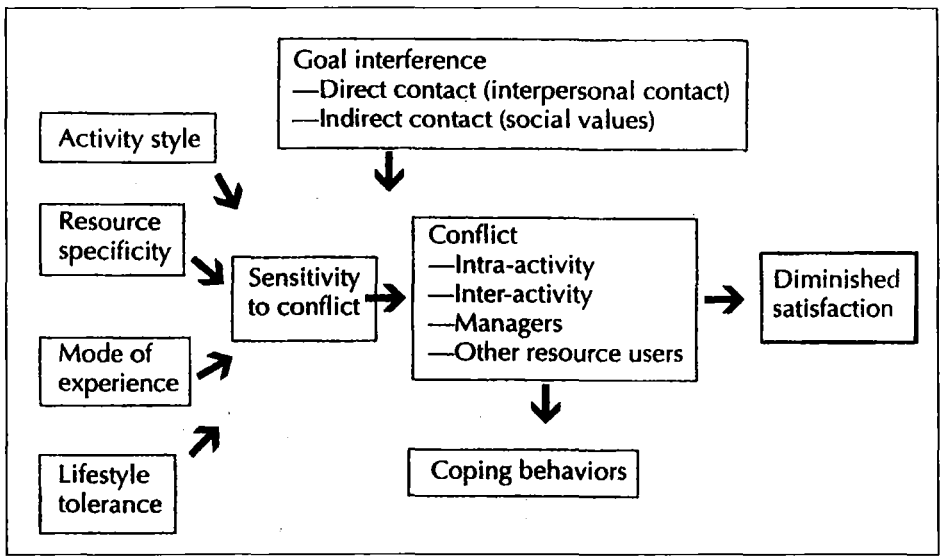

Figure 2.1: Expanded Conflict Model
Source: Manning (1999). p. 202

Many studies have confirmed that conflict is occurring in natural environments and there are a variety of factors influencing this. For example, in his study of sea-kayakers and motorised watercraft in the Abel Tasman area, Hawke (2000) found that inter-group conflict was occurring between motorised users and sea-kayakers as well as intra-group conflict within the motorised group who had different perceptions of appropriate behaviour. This study suggested that perceptions of difference could play an important role in recreational conflict (Hawke and Booth, 2001) as people see the way others partake in the same activity as 'different' from their own participation. A study of visitors on both guided and non-guided walks on Franz Josef Glacier (Corbett, 2001) illustrated how conflict could occur with different activities in the same area. For example 22 percent of non-guided visitors and 25 percent of guided visitors indicated that they were concerned over the level of aircraft use in the area. Large groups were also found to be an issue in this study with 21 percent of non-guided visitors and 20 percent of guided visitors expressing some concern about encountering large groups on the glacier. This illustrates the way perceptions of what is appropriate in a recreational setting can lead to conflict. Horn (1994) presented an

extensive discussion of conflict based on her study of walkers and mountain bikers in the Canterbury area. Her findings illustrated the often-asymmetrical relationship that occurs in recreational conflict, with walkers in the study disliking mountain bikers much more than mountain bikers disliked walkers.

2.2.3 Displacement and Related Coping Mechanisms

Displacement occurs when people change their recreational behaviour to avoid unwanted encounters with others. Spatial displacement is when users change the location of their recreational activities. Temporal displacement occurs when users recreate in the same location but change the time of recreation (for example changing from recreational use during the summer to the autumn and winter seasons). A third form of displacement is activity substitution, which occurs when a user changes the activity they do rather than the setting or time they recreate in an area (Manning, 1999). Displacement can cause a cycle of "invasion and succession" (Clark et al, 1971, p. 145) where displaced users are replaced by new recreationists with higher tolerances for crowding (Manning, 1999). This can result in each new generation of users being highly satisfied; however consideration must be given to the dissatisfaction of the displaced users.

A second coping mechanism used by outdoor recreationists is rationalisation, which involves people evaluating activities as satisfactory regardless of the conditions they experienced (Manning, 1999). Rationalisation is based on Festinger's (1957) cognitive dissonance theory, which suggests that people try to order their thoughts to reduce inconsistencies (Manning, 1999). For example, a recreation experience may

be reported as highly satisfactory despite the recreationist experiencing feelings of conflict and crowding. This can be attributed to people's desire to have a satisfactory experience due to the time, money and effort often put into outdoor recreation (Dulkul, 2001) and the re-evaluating of their experience after it occurred to better fit with their expectations.

Related to rationalisation is product shift, which occurs when recreation opportunities for an area are redefined to fit with the site's changing environmental or social conditions (Shindler & Shelby, 1995). One example of this is the redefinition of wilderness to semi-wilderness (Dulkul, 2001). In New Zealand, for example, some tramping tracks (like the Great Walks) have shifted from providing traditional tramping experiences to being iconic sites on the tourist trail. Due to product shift, visitors may continue to report high levels of satisfaction at a site, even though actual conditions may have deteriorated, because their expectations for that site have been altered (Laven, Manning & Krymkowski, 2005).

Coping mechanisms are a concern in outdoor recreation for two main reasons. First, coping mechanisms allow for satisfaction levels for an area to remain high, despite the areas changing conditions. Second, the use of coping mechanisms can put increased pressure on a wider range of environments. Spatially displaced users seek more remote sites and this can not only increase the physical impacts at these sites but also as contribute to a reduction of the wilderness area. There are also safety concerns as users are forced into more remote environments and more challenging seasons for which they may not have the skills or experience (Kearsley et al.,, 2001).

While displacement is an important social impact the extent of displacement and related coping strategies is difficult to measure. On-site surveys generally find satisfaction is high as people choose sites and activities consistent with their preferences and any users that are already displaced are not represented in the survey.

Despite difficulties with measuring the use of coping mechanisms, studies indicate that they are being utilised to some degree by visitors to natural areas. Kearsley (1997) for example, found that one fifth of trampers surveyed chose the particular track they were on to avoid other people. Approximately one fifth also said they had expected to see fewer people then they did, and 16 percent of these indicated they would choose a different track in the future because of this. In his study of the displacement of trampers on New Zealand's Great Walks network, Sharpe (1999) found that temporal displacement, spatial displacement and activity substitution (in that order of importance) were occurring. The main reasons for these coping mechanisms were crowding, over development of tracks, and hut fees. Manning and Valliere (2001) also found that a range of coping mechanisms were used by visitors to Acadia National Park in the United States of America, where 94 percent of respondents in their study had used at least one coping mechanism.

The above examples show that coping mechanisms are definitely occurring in natural areas. Gaining an understanding of the extent to which they are being utilised in outdoor recreation, and their relationship with crowding, conflict and visitor satisfaction, is an ongoing challenge to managers and researchers.

2.2.4 Perceptions of Biophysical Impacts

The concepts of crowding, conflict, displacement and related coping mechanisms illustrate the way in which the type, behaviour, distribution and number of other visitors encountered can affect the visitor's experience. It has been argued that perceptions of biophysical impacts can also influence the quality of a visitor's experience (Kuss, Graefe & Vaske, 1990a). Just as Stankey (1989) suggested that crowding could occur due to evidence of others, these arguments suggest that biophysical impacts such as track widening, vegetation damage, litter and even the extent and standard of facilities provided for visitors (for example huts and boardwalks, which are biophysical impacts themselves), when inconsistent with what the visitor views as appropriate, can negatively affect the visitors experience. Discussion now turns to the ways in which visitor's impacts can be managed in natural areas.

2.3 VISITOR IMPACT MANAGEMENT: CARRYING CAPACITY

Early research (primarily in North America) into measuring and managing social impacts in outdoor recreation was based on the carrying capacity concept. This concept was derived from range and wildlife management, where the term referred to the maximum number of animals a specified land area could sustain without destroying the resource base that the land provided (Hammitt & Cole, 1998). The application of the carrying capacity concept to the management of visitor impacts was based on the idea that a given area could only withstand a certain amount of recreation before unacceptable impacts occurred and the quality of recreation could no longer be sustained (Hammit & Cole, 1998; Hendee & Dawson, 2002). When

viewed as a simple linear model, the carrying capacity concept suggests that as the number of users in a given area increases, the impacts in that area increase at the same rate (see figure 2.2). While this model serves to illustrate the relationship between use and impact it does not suggest the point at which carrying capacity has been reached (Manning, 1999).

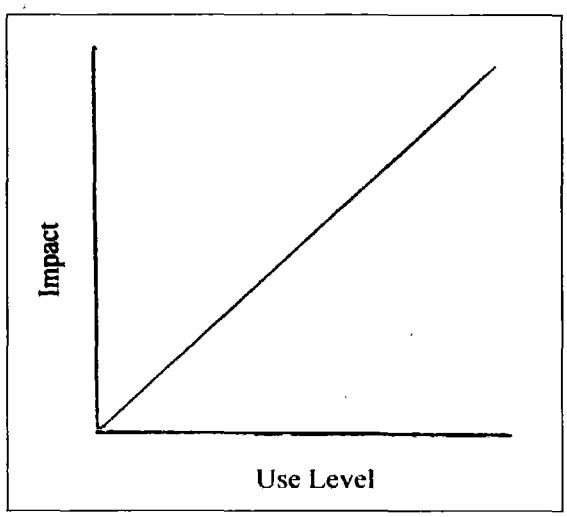

Figure 2.2: Hypothetical relationship between visitor use levels and social impact levels. As uses levels increase, impact increases at the same rate.

Alldredge's (1973) satisfaction model provides a hypothetical example of how carrying capacity applies to visitor satisfaction in wilderness areas. This model (see figure 2.3) suggests that as the number of visitors in a wilderness area increases, the average satisfaction experienced by each visitor decreases. The total satisfaction (of all visitors) continues to rise, although at a decreasing rate, until a certain point (in this example the tenth visitor) when total satisfaction no longer increases and marginal satisfaction (the change in total satisfaction) drops below zero. This point (the top of the total satisfaction curve, and where the marginal satisfaction line drops below zero) is where carrying capacity is reached as any additional visitors result in decreasing the average satisfaction of each visitor, as well as the total satisfaction of

all visitors. Viewing carrying capacity in this way suggested that a specified level of visitor density could be established, beyond which, negative impacts would occur (Manning, 1999).

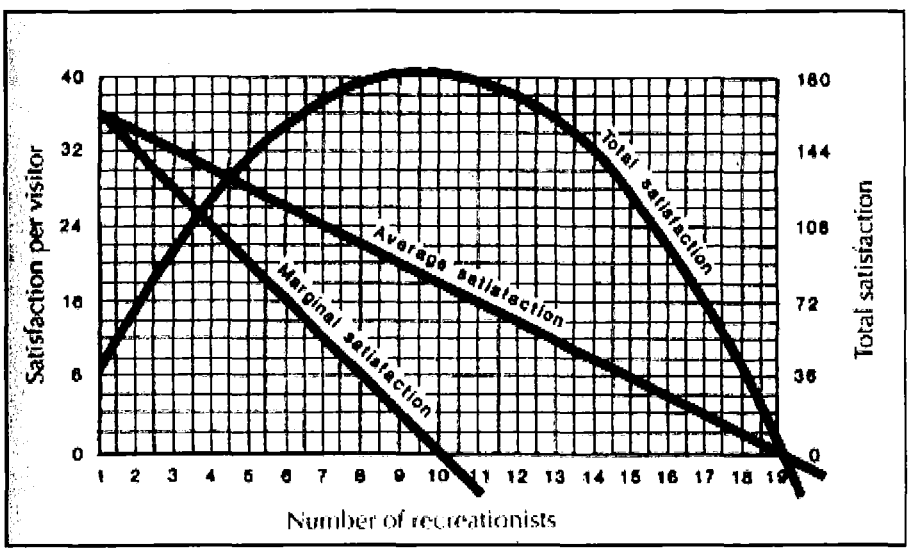

Figure 2.3: Satisfaction Model
Source: Manning (1999). p. 85

The carrying capacity model has proved insufficient to fully explain user dissatisfaction in outdoor recreation, as use levels have not been strongly correlated with negative impacts (Eagles & McCool, 2002; Hendee & Dawson, 2002). While the numbers of other users can be an important factor in an outdoor recreationist's experience, social impacts in outdoor recreation settings are also affected by factors such as the distribution and behaviour of other users. Many studies have shown that there is only a weak relationship between use levels and impact (See Kuss et al.,, 1990a for a review), suggesting that attempts to establish carrying capacities may be of little use in solving social impact problems in natural areas (Kuss, Graefe & Vaske, 1990b). The more integrated concepts of crowding and conflict (see sections 2.2.1 and 2.2.2) help explain the complexities leading to negative social impacts in outdoor recreation settings better than looking at use levels alone. Examination of the coping

mechanisms that may be employed by visitors as a reaction to negative experiences in natural areas also adds to the argument that user satisfaction in natural areas is not strongly related to use levels.

2.4 VISITOR IMPACT MANAGEMENT: THE LIMITS OF ACCEPTABLE CHANGE FRAMEWORK

Understanding the relationship between visitor use and impacts in natural areas based on the simplistic carrying capacity models has been deemed unsatisfactory, as there is not a linear relationship between use and impact. In response to its limitations, the carrying capacity model has been reformulated into a number of other frameworks for managing visitors in natural areas. Frameworks such as the Limits of Acceptable Change (Stankey, Cole, Lucas, Peterson & Frissell, 1985), Visitor Impact Management (Kuss et al.,, 1990b), and Visitor Experience and Resource Protection, (Manning, Lime & Hof, 1996) were developed in North America and have refocused the key question in recreation management from 'how much use is too much?' to 'how much use or impact is acceptable or should be allowed?' This has changed the emphasis from the number of users in a recreation area to the conditions that are desired for that area (Needham & Rollins, 2005).

Deciding what conditions in a natural area are acceptable and appropriate is ultimately a value judgement (Eagles & McCool, 2002) and for several decades managers of natural areas have been trying to find rational and defensible ways of making these decisions (Cole & Stewart, 2002). The contemporary planning frameworks mentioned above provide structured processes for addressing the evaluative

component of visitor impact management. Nilsen and Taylor (1997) provide a detailed analysis and comparison of these visitor management frameworks. This section provides an overview of the subjective and value-laden nature of visitor impact decision making, then turns to a detailed discussion of the LAC framework which is the focus of this thesis.

2.4.1 Evaluative Nature of Visitor Impact Management

It is well recognised in outdoor recreation literature that decisions regarding visitor use and impacts in natural areas involve value judgments (Eagles & McCool, 2002; Krumpe & McCool, 1997; Manning, 1999; Shelby & Heberlein, 1986). As well as monitoring current conditions, managers of natural areas must specify the conditions these areas aim to have. The specification of desired conditions in natural areas (such as identifying area values and visitor impact acceptability standards) is intrinsically subjective (Krumpe & McCool, 1997) as it involves judgments based on people's opinions of what is important and appropriate.

The acknowledgement of the value-laden nature of decision making regarding visitor impacts in natural areas leads to questions about how to incorporate values into the planning process. There has been debate, for example, about the usefulness of focusing on the values of current visitors in natural areas when setting evaluative standards (see Manning, 2003; Stewart & Cole, 2003). The opinions of visitors are important, yet they do not always provide a sufficient basis for decision making, because visitors form only one of many relevant stakeholder groups whose needs should be considered (Cole and Stewart, 2002). The LAC-based approach examined

in this study includes the values and opinions of a variety of stakeholders in deciding what levels of visitor impacts are acceptable in natural areas.

2.4.2 The Limits of Acceptable Change Planning Framework

Of the contemporary recreation planning frameworks, the LAC process has received the most attention in international literature (Sutton, 2004). LAC was developed in the United States of America in 1985 by Stankey et al., with the aim of providing a management framework to decide how much impact (change) from visitor use should be tolerated in a wilderness area (Stankey et al.,, 1985). The LAC process recognises that change will occur in natural areas with visitor use (Hendee & Dawson, 2002). It does not try to stop change, but focuses on deciding how much change is appropriate and acceptable for each natural area and how it should be managed (Corbett, 1995). LAC provides for the management of both social and biophysical visitor impacts.

The LAC process outlines nine steps that allow where, and to what extent, change is considered acceptable. These steps are discussed in many publications (such as Eagles & McCool, 2002; Hendee & Dawson, 2002; Stankey et al.,, 1985; Prosser, 1986) and outlined in table 2.1. A more detailed discussion of several important aspects of the LAC process follows.

Table 2.1: The nine steps of the Limits of Acceptable Change planning framework
Source: Eagles & McCool, 2002; Hendee & Dawson, 2002; Stankey et al.,, 1985; Prosser, 1986

Step	Description
1: Identify area concerns and issues	The purpose of this step is to identify the values, issues and concerns held for an area, including any special features of the area and its role in the overall natural area system. Important to this step is the inclusion of stakeholders in identifying values and concerns. This step is to provide managers with an overall understanding of the area and to provide the basis for the following steps.
2: Define and describe opportunity classes	This step requires the definition of a range of opportunity classes (the type of recreation experience available) appropriate for an area. For a small area just one opportunity class may be identified, while larger areas may warrant several different classes. The classes identified in this step can be related to conditions that already exist as well as conditions that may be desirable for the area.
3: Select indicators of resource and social conditions	This step involves identifying indicators of conditions for each opportunity class. Indicators are specific attributes of an area, such as the number of damaged trees at a campsite, or the number of encounters on a track, that are indicative of the overall condition of an area.
4: Inventory resource and social conditions	In this step an inventory of existing conditions is undertaken for each recreation opportunity. The inventory provides information regarding the current condition of an area and is guided by the indicators selected in step 3.
5: Specify standards for resource and social indicators	This step involves the specification of standards for each indicator. These standards provide measures against which current conditions can be judged acceptable or not.
6: Identify alternative opportunity class allocations	A variety of alternative opportunity class allocations are identified in this step. These alternative allocations consider a variety of ways in which an area might be managed to provide different mixes of opportunity classes.
7: Identify management actions for each alternative	This step involves identifying the management actions that would need to be taken to achieve the conditions required in each alternative (identified in step 6). This involves identifying the differences between the current conditions of an area and those deemed acceptable (step 5). Management actions to remedy those differences must be considered where existing conditions are close to or below acceptable standards.
8: Evaluate and select an alternative	In step 8 the costs and benefits of each alternative are analysed and the preferred option is selected.
9: Implement actions and monitor conditions	This is the final step of the LAC process in which the preferred option is implemented and a monitoring programme established to assess the effectiveness of management actions in meeting desired goals.

2.4.2.1 The Role of Public Participation

Many authors (Eagles & McCool, 2002; Johnson, Ward & Hughey, 2001; Krumpe & McCool, 1997; Stankey, 1997) have emphasised the importance of including stakeholders and the local community in the decision-making process for natural area

and visitor management. Natural area planning tasks such as identifying important values, setting standards and proposing management actions are intrinsically subjective and take place in a politicised context where different groups hold both shared and conflicting opinions. Public participation can contribute to natural area decision making by filling gaps in the scientific knowledge base, indicating what issues are socially and politically relevant, and enhancing the quality of discussion (Krumpe & McCool, 1997). Involving stakeholders in planning for natural areas and the decision-making process also means that the decisions for visitor management in a natural area are more likely to be understood and supported (Krumpe & McCool, 1997; Johnson et al.,, 2001; Hendee & Dawson, 2002).

While the original LAC process (Stankey et al.,, 1985) did not specify the inclusion of the public, the importance of public participation is often highlighted in discussions of the process, and applications of LAC invariably involve the public in some form (for examples see Hendee & Dawson, 2002; Kazmierow, 1996; Wray, Harbrow & Kazmierow, 2005). Krumpe and McCool describe application of the LAC process as being 'deeply intertwined with substantial public involvement' (1997, p.16). Like Eagles and McCool (2002), they argue that public participation is an essential part of LAC as many of the decisions made in the LAC process (such as determining what levels of change are acceptable) are value laden.

Public participation is clearly important in natural area planning and is an essential part of the LAC process. The key focus of this study is to consider how the public can be effectively included in the evaluative components (identifying area values,

issues and concerns and setting acceptability standards for visitor impacts) of LAC-based decision making.

2.4.2.2 Identification of Indicators and Standards

An important yet often problematic part of the LAC process is the identification of appropriate indicators of visitor impact conditions and the specification of standards for these conditions (see steps 3 and 5 in the LAC process, table 2.1). Indicators are measurable variables that singly or in combination indicate the condition of an issue or concern (Nilsen & Tayler, 1997). Standards provide specific and measurable limits of acceptability for impact conditions as measured by the indicators. For the LAC process to be effective therefore, appropriate indicators and standards must be established.

In his discussion of LAC in relation to visitor impact management in an Australian context, Prosser (1986) cautioned that the selection of suitable indicators and standards was the most limiting factor of the process because Australia did not have the same extensive research base into social impacts as North America. These concerns are also relevant for New Zealand, where social impacts research is still relatively new. Some concern regarding the selection of indicators and standards was anticipated in the original guide to the LAC process (Stankey et al.,, 1985), which advised that there was no need "to be paralyzed by concerns as the whether the 'right' indicators have been chosen or whether the standards are 'correct'..." (Stankey et al.,, 1985, p.14). Further, "management will be able to revise indicators and standards in response to improved information" (Stankey et al.,, 1985, p14). Likewise, Prosser

(1986) agreed that experience and review of the LAC process would assist in developing appropriate indicators and standards for the Australian situation.

Although the concerns discussed above were raised two decades ago, they are still relevant to the application of LAC. While there has been increasing interest in the LAC process in Australasia in recent years, the development of appropriate indicators and standards is still very much at a 'trial and error' stage. This thesis will therefore contribute to the knowledge surrounding the appropriate development of indicators and standards for the implementation of LAC in Australasia.

2.4.2.3 Monitoring and Evaluation

An important aspect of the LAC process is the inclusion of ongoing monitoring and evaluation, which is a step specific to this visitor management framework. According to McCool and Cole (1997, p.73) monitoring is "essential to determining what types of changes in social and biophysical conditions may be emerging over time and critical to determining the effectiveness of management actions in addressing impacts and concerns". Furthermore, monitoring "provides information vital to management because it may suggest needs for revisions *(sic)* in actions or acceptable conditions" (McCool & Cole, 1997, p. 73). Therefore the explicit inclusion of a monitoring component in the LAC process provides an important step that is essential to the effective management of visitors in natural areas on an ongoing basis.

2.4.2.4 A Structured Management Tool

The LAC framework provides a systematic process for the inclusion of public participation to determine the appropriateness and acceptability of various conditions in natural areas. The structured and explicit nature of the decision-making procedures used in the LAC process means that actions taken by managers are understandable and defensible (Eagles & McCool, 2002). The attributes of LAC as a management tool have been summed up by Prosser (1986, p. 10) who stated:

> Important features of the system are that it emphasises explicit, measurable objectives; promotes diversity in recreation provision; relies on quantitative field-based standards; provides a flexible, issue-driven approach that is responsive to local situations; focuses on critical problems at specific locations; allows for public involvement; avoids restricting and regulating users except where and when really necessary; and, provides a systematic framework for managing conditions that are related to recreation behaviour and can be influenced by managers.

2.4.2.5 Limitations and Weaknesses

One limitation of the LAC process is that it can seem time-consuming and expensive (Eagles & McCool, 2002) and involves lengthy investigations (Corbett, 1995). The application of the LAC process in the Bob Marshall Wilderness Complex, United States of America, for example, involved a task force of up to 50 people, more than 80 meetings, information and working sessions, and took nearly four years to complete (Hendee & Dawson, 2002). Eagles and McCool (2002) counter these claims, suggesting that most management plans involve the lengthy steps of LAC but these are often hidden and are not subject to public participation and review. McCool and Cole (1997) also dismiss the notion that LAC is too complicated, arguing that is no more complicated than other planning and land management systems. They outline barriers to the LAC system in terms of wider institutional problems (in a North

American context) rather than as inadequacies with the process itself. Such problems include inadequate funding and lack of support in protected area management, the compartmentalisation of functions within management (for example the separation of planning and implementation) and a focus on science-based rather than experiential knowledge, Likewise Stankey (1997) argued that institutional limitations are the most constraining factor in effectively implementing the LAC process.

Furthermore, LAC cannot be seen as an overriding framework for visitor management in natural areas. Due to the lengthy nature of the LAC process, it is best applied at a local level rather than regionally (Corbett, 1995). Nor will LAC provide an appropriate framework for all natural areas. Limits of Acceptable Change is a process for dealing with conflicts and it involves compromises between different goals for an area. If conflict does not exist or if some goals cannot be compromised, then the LAC process will not be effective (Cole & McCool, 1997).

Despite its limitations and weaknesses, the LAC process has been implemented with some success in North America and Australasia (see Eagles & McCool, 2002; Hendee & Dawson, 2002; Kazmierow, 1996; Needham & Rollins, 2005; Wray et al.,, 2005) and the benefits of LAC planning outweigh the constraints to conducting the process (McCool & Cole, 1997). Furthermore, the management concept presented in the LAC process has proved popular and, as suggested by Stankey et al., (1985), field implementation of LAC will provide the experience to modify and improve it in order for it to become a more effective planning framework.

2.4.2.6 Applications Outside of Natural Area Management

Although the LAC planning framework was created for natural area management there has been some suggestion that the process would apply in other areas. Ahn, Lee and Shafer (2002) applied the first three steps of the LAC process to three communities in Texas, United States of America, in order to examine attitudes to tourism development and perceived changes that tourism would make. This was part of an attempt to provide a management framework for the sustainability of tourism. A variety of attitudes were found in the different communities and results suggested that different conditions and indicators would be needed for different zones of tourism development. The study concluded that a planning process such as LAC may "help define and operationalize sustainability as tourism development commences" (Ahn et al.,, 2002, p.13). This example shows that there may be some place for the LAC planning process in areas outside of natural area management.

2.5 APPLICATION OF THE LIMITS OF ACCEPTABLE CHANGE PROCESS IN NEW ZEALAND

The LAC process has often been discussed in relation to managing visitors in natural areas in New Zealand (Baily et al.,, 2003; Corbett, 1995; Sutton, 2004) and was suggested and outlined as a possible visitor management framework in an internal Department of Conservation report in 1989 (see Tyson, 1989). More recently Booth (2006) has suggested that a management process such as LAC can provide a framework for managers to address visitor impact issues in New Zealand. Despite this interest there have been few applications of the LAC process in New Zealand. Three applications that have taken place are discussed below.

Waitangiroto White Heron (Kotuku) Colony

Kazmierow's (1996) study of the ecological effects of tourism at the Waitangiroto Nature Reserve in South Westland followed a three-stage methodology based on the LAC process. This study investigated the acceptability of the effects of commercial wildlife-viewing tourism operations on the white herons at the colony. The first stage of research involved qualitative interviews with relevant stakeholders to identify their concerns regarding the area. The second stage consisted of a fieldwork programme at Waitangiroto, which involved observation of the interactions between bird life and tourists and addressed the concerns raised in stage one. The third stage of the research identified acceptability levels for various tourism/wildlife interactions and compared these to the actual interactions measured in stage two. In a focus group, stakeholders were presented with five scenarios and asked to rate the acceptability of various levels of interaction for each scenario. Results showed various levels of acceptability for the scenarios, however there were some interaction levels that were acceptable to all stakeholders and all stakeholders agreed that the level of disturbance to heron chicks was very unacceptable. Kazmierow (1996) concluded that the approach used in his study could not answer long-term questions about the ecological sustainability of impacts. Including stakeholders through this approach, however, was seen to be highly beneficial in some ways, particularly by emphasising stakeholder rather than researcher values in outlining problems and evaluating acceptability levels.

Paparoa National Park

In a study of three sites at Paparoa National Park (Pancake Rocks, Fox River Caves and the Westland Black Petrel colony) the first stage of the LAC process was

implemented to examine issues and concerns for the area and identify indicators of acceptable change (Johnson et al.,, 2001). Researchers interviewed stakeholders regarding their views on the values and issues, as well as asking them to suggest indicators for measuring change at the sites. Visitors to the Pancake Rocks and Fox River Caves were surveyed to gain information regarding their experiences at the sites. Respondents also rated a number of indicator conditions at the site. For the Pancake Rocks site, results showed no indication that any environmental or social impacts exceeded visitor acceptability levels. Results from the Fox River Caves survey suggested that two indicators (amount of interpretation/information about the site and visible visitor impacts) might have exceeded acceptability levels as visitors rated these factors negatively. In summarising the study, Johnson et al., (2001) suggested that the indicators would need to be refined by management and experts, that public consultation would be necessary if management decisions are to be supported, and that once management goals have been clearly defined, the next steps of the LAC process could be implemented.

Mason Bay

The LAC process provided the basis for a recent Department of Conservation study looking at social visitor impacts and experiences in Mason Bay, Rakiura National Park (Wray et al.,, 2005). This study had several objectives. They included identifying issues and concerns with input from stakeholders and management, designing and implementing a monitoring programme to address concerns and identify knowledge gaps, evaluating the level of acceptability of certain impacts and designing a replicable method to be used in both Mason Bay and other areas in the future.

To address the above objectives, three main steps were included in the methodology. First, a focus group of relevant stakeholders identified values and concerns for the Mason Bay area. Second, a fieldwork programme at Mason Bay was undertaken. This consisted of a visitor survey (developed primarily to address the concerns raised in stage one), and on-site and participant observations by the researcher. Finally a second focus group of stakeholders rated the acceptability levels of a variety of impact scenarios. Comparison of stakeholder acceptability levels with actual measured levels of impact occurring in Mason Bay (identified through the on-site fieldwork) showed that five visitor impacts had reached unacceptable levels. The study made a number of recommendations for visitor management at Mason Bay and proved LAC to be a successful process for including stakeholders to identify limits of acceptable change in Mason Bay. The study also pointed to the need for further research to see if the LAC method can be replicated on other Department of Conservation managed sites.

2.5.1 Methodological Issues

The use of stakeholder focus groups provided some logistical problems in the research of Kazmierow (1996) and Wray et al., (2005). While Wray et al., (2005) noted that participation in focus groups is generally high, it can be difficult to organise a meeting at a time and place all relevant stakeholders can attend. Kazmierow (1996), for example, found that although 11 out of 15 invited stakeholders planned to attend his focus group, which aimed to set limits of acceptability for visitor impacts on wildlife at Waitangiroto White Heron Colony, only five of these actually did attend. Reasons for not attending included things such as travelling time and family commitments (Kazmierow, 1996). Likewise not all identified stakeholders were present at all focus

groups in the Mason Bay research (Wray et al.,, 2005). Having some stakeholders missing from focus groups means that the views of all interested parties may not be represented.

The second issue is the number of stakeholders involved in prescribing acceptability levels for the visitor impacts identified. Both Kazmierow (1996) and Wray et al., (2005) used a statistical method of determining levels of acceptability. Their method involved 5-10 stakeholders at a focus group rating the acceptability of impact scenarios using a four point scoring system. The mean of the stakeholder acceptability levels was then calculated. This method of reaching acceptability levels proved successful in both studies.

However the appropriateness of using such a small number of stakeholders to determine acceptable levels for visitor impacts is questionable as the views of only a few are represented. A clear principle of probability sampling is that the larger the sample size the more accurately it represents the population it was drawn from (Babbie, 2004). While it may not be possible to select stakeholders randomly and the results of Kazmierow (1996) and Wray et al., (2005) may well be valid, this principle suggests that involving a larger number of stakeholders in determining acceptability levels should improve the reliability of the results. Involving large numbers of stakeholders is difficult in focus group situations because focus groups ideally include small numbers of people to promote organised discussion of issues.

2.6 CONCLUSION: THE ROLE OF THIS RESEARCH

As understanding about both social and biophysical conditions related to visitor use in natural areas has increased, it has become clear that the focus of recreation management needs to be on the desired conditions and acceptability of impacts for an area rather than on numbers of users alone. The important question is how to decide what impact levels and conditions are desirable and acceptable. Limits of Acceptable Change is one framework for managing visitors in natural areas that provides a process to answer this question.

Limits of Acceptable Change has been praised in the literature as being a framework that provides a structured process for determining the desired visitor impact conditions for a natural area (Eagles & McCool, 2002, Prosser, 1986). Many authors have pointed to the importance of including the public in the process (Eagles & McCool, 2002; Johnson et al.,, 2001; Krumpe & McCool, 1997; Stankey, 1997). This study addresses the specific ways in which the relevant public can be involved in the LAC process by discussing the methods appropriate for including stakeholders in the first stages of the LAC process. Although discussion in this thesis relates specifically to the application of the LAC process in New Zealand, it will add to the general understanding of how LAC may be usefully applied to the management of visitor impacts in natural areas.

In New Zealand, rising visitation and changing patterns of use have led to concern over visitor impacts in natural areas, particularly social impacts such as crowding, conflict and displacement. The Department of Conservation must include the public

to manage visitor use of natural areas in a way that keeps visitor impacts within acceptable limits. The LAC framework has the potential to provide a defensible and structured process for including stakeholders in determining what levels of visitor impacts are acceptable in these areas.

Using the traditional LAC framework (up to Step 5) as a basis, this research considers how to determine acceptable levels of social visitor impacts in New Zealand's natural areas. A key focus is the way in which stakeholders are included in the decision making process. Following the work of Kazmierow (1996) and Wray et al., (2005), this research uses a three-stage method which involves stakeholders in determining values, issues and concerns and specifying levels of acceptable impacts for a natural area, and then compares acceptability levels with those impacts currently occurring at the site. The methods used for stakeholder inclusion in the process are adapted to address the issues surrounding the numbers of stakeholders participating in both the identification of values and concerns and the setting of acceptability levels. The LAC component of this thesis therefore focuses on the method used, and aims to assess the usefulness of this method in managing visitor impacts in New Zealand's natural areas.

Chapter 3: Introduction to the Study Site

3.1 INTRODUCTION

The study site used for this research was the Mingha-Deception track in Arthur's Pass National Park. This chapter describes the track and discusses visitor use and impacts on the track. The purpose of this chapter is to locate the reader by providing a description of the track and the context for the study of visitor impacts at this site. Discussion begins with a description of the Mingha-Deception track and the surrounding environment (section 3.2). An outline of the amount and types of visitor use and associated social visitor impacts and an overview of current visitor impacts research for the track is then presented (section 3.3).

3.2 TRACK DESCRIPTION

3.2.1 Location

The Mingha-Deception track is located in Arthur's Pass National Park, in the Southern Alps between the West Coast and Canterbury. The Park is bisected by the Canterbury-West Coast road and the Tranz Alpine railway. Arthur's Pass National Park is situated in a rugged alpine environment, characterised by mountains, glaciated passes and valleys, and braided rivers. The Park is scientifically valued for its geological features, as a habitat for threatened species and for the environmental range which includes eastern grasslands, beech forests, sub-alpine and alpine environments and western rainforests (Department of Conservation, 2006). Arthur's Pass National Park is also valued for its recreation opportunities. The Park is close to centres of population (within 1.5 hours drive from Christchurch and the West Coast) and provides access to a variety of mountain opportunities which include tramping,

walking, climbing, running, camping, hunting, fishing, photography and nature appreciation.

The Mingha-Deception track provides a sub-alpine crossing of the Southern Alps, known as the main divide, and is approximately 23 kilometres long. The track runs from the confluence of the Mingha and Bealey rivers (Mingha track end), five kilometres south of Arthur's Pass village, to the Deception-Otira river confluence (Deception track end) a few kilometres west of Otira (see figure 3.1 for location). Both ends of the Mingha-Deception track are located on the State Highway 73, the main road between Christchurch and the West Coast, allowing for easy vehicle access to the track.

3.2.2 Track Description and Standard

The Mingha-Deception track is a partially-marked track that provides one of the most popular overnight tramps in Arthur's Pass National Park (Department of Conservation, 2005a). The Mingha side of the track is shorter and easier than the Deception side. Tramping from the Mingha track end to Goat Pass hut takes around five hours. This side of the track includes open river flats, formed track through bush, and extensive boardwalks over Goat Pass (see plates 3.1 & 3.2).

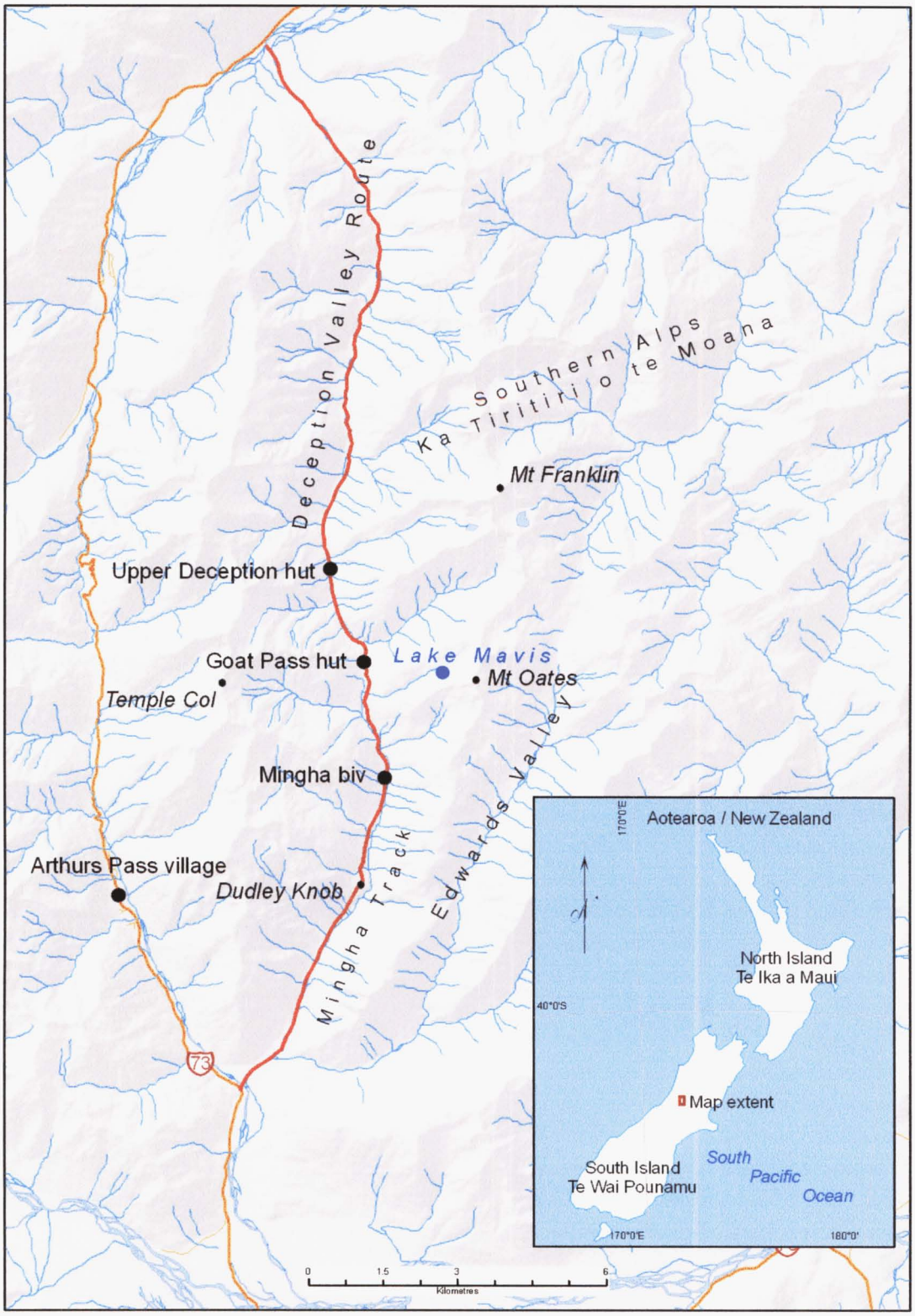

Figure 3.1: Location of the Mingha-Deception track. The red line marks the track.
Source: Information Management Unit, Canterbury Conservancy Office, Department of Conservation

Plate 3.1: Looking down the Mingha Valley from Dudley's Knob (approximately halfway up the Mingha Valley)

Plate 3.2: Looking down the Mingha Valley from Goat Pass

The Deception side of the track (between the Deception track end and Goat Pass Hut) takes approximately six to eight hours. Although there are short sections of marked track through bush, travel on the Deception side is largely in the riverbed and includes scrambling and hopping over large boulders in the upper reaches of the Deception River (see plates 3.3 and 3.4).

Plate 3.3: Upper Deception Valley
Source: Palmerston North Tramping and Mountaineering Club, 2006

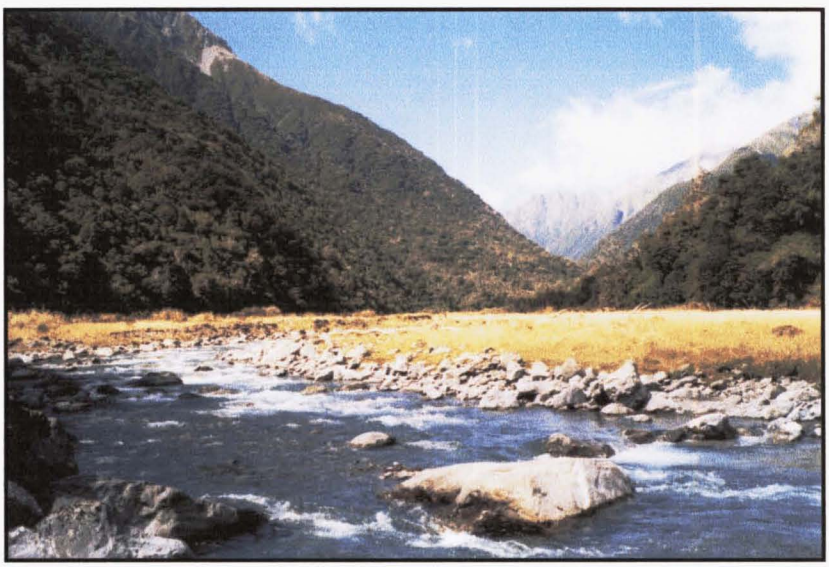

Plate 3.4: Lower Deception Valley

The riverbed sections on both the Mingha and Deception sides are un-tracked and marked primarily by rock cairns. The track has approximately 20 river crossings, only 4 or 5 of which are on the Mingha side. The number of river crossings is dependent on where and how often users choose to cross the river, and on the frequently changing course of the river.

Accommodation on the Mingha-Deception track is provided in Goat Pass hut (see plate 3.5), which sleeps 20 people. Goat Pass hut has radio communication with the

Arthur's Pass Visitor Centre but no heating or cooking facilities. There is also a smaller six-bunk hut (Upper Deception hut) and a bivouac (Mingha biv) on the track (see figure 3.1 for locations).

Plate 3.5: Goat Pass hut

The Department of Conservation classifies the Mingha-Deception track as a backcountry walk-in tramping track. Department of Conservation (2003) descriptions of the Mingha-Deception track suggest that the track requires reasonable fitness levels and experience and that users need to be well equipped.

3.2.3 Environment

The Mingha-Deception track has been described as showcasing "just about the full range of environments within the Park across the Main Divide" (Department of Conservation, 2006, p.100). There is a marked vegetative distinction between east and west, as forests in the Mingha Valley are dominated primarily by mountain beech while rata and kamahi are the primary species in the Deception Valley. Forests give way to a range of alpine vegetation on Goat Pass, including sedges, herbs and shrubs.

River flats are bare or covered in grasses and tussocks. The Mingha and Deception valleys are also home to a variety of native birds including several endangered or vulnerable species (for example, blue duck, kiwi, native falcon, South Island kākā, kea).

Climate information specific to the Mingha-Deception track is not available, but is likely to be comparable to that measured in other areas of the park. Rainfall is highest in the west and on the Divide with an average rainfall of around 5000 millimetres per annum. In Arthur's Pass village the average rainfall is around 4500 millimetres per annum but at Bealey, 15 kilometres to the east, it drops to around 1500 millimetres per annum. Rainfall is unlikely to be this low at the base of the Mingha track however, as this is only around five kilometres east of Arthur's Pass village. Rainfall often occurs in short, intense storms which can cause rivers to rise rapidly. Snowfall on the Mingha-Deception track occurs primarily between June and October. Thawing snow during spring can also cause high river levels (Department of Conservation, 2006).

3.3 VISITOR USE AND IMPACTS

3.3.1 Track Users and Use Levels

There is little information about visitors on the Mingha-Deception track. Use levels are largely unknown as there are no track counters. Hut books may be analysed to provide numbers of visitors but this would not provide a true picture of the numbers using the track as not all visitors to New Zealand tramping tracks fill in hut books (Palmer, 1979; Booth & Peebles, 1995). However, although absolute numbers cannot

be specified, a general picture of the type and trends of visitor use of the track can be created from the information available.

It is reasonable to assume that visitor numbers to the Mingha-Deception track have been increasing as this is the trend for Arthur's Pass National Park, where use has increased (based on visitor centre figures) six percent on average per annum since the mid-1990s (Department of Conservation, 2006). Palmer (1979) suggested that approximately 1064 people had visited the Mingha-Deception track over 10 months from March 1978 to January 1979. Conversations with Department of Conservation staff suggest that track use is now around several thousand visitors per annum although this is a 'best guess' estimation only. What is clear is that visitor numbers to the track have increased over the last several decades.

Trampers are the traditional users of the Mingha-Deception track and tramping is one of the main activities carried out on the track today (see plate 3.6). While Palmer (1979) suggested that 77 percent of visitors tramped from the Mingha to the Deception end of the track, it is unknown if that figure would be relevant today. Results from the present study (see chapter 6) suggest that the routes taken by trampers are more varied and include walking the track either direction, walking part of the track as a return trip (for example from the Mingha track end to Goat Pass hut and back) or using a portion of the track as part of a different route, for example travelling up the Mingha Valley and out via Lake Mavis and the Edwards Valley or over Temple Col (see figure 3.1 for locations).

Plate 3.6: Trampers taking a rest on Goat Pass

Temporal use patterns are likely to be similar to others in Arthur's Pass National Park, which are highest during the summer from December to April (Department of Conservation, 2006). Trampers on the Mingha-Deception track come from both New Zealand and overseas. Research about Arthur's Pass National Park (Espiner & Simmons, 1998) suggests that the mix of overseas and New Zealand visitors is changing. From 1980 to 1995 the predominant place of visitor origin shifted from Christchurch, New Zealand, to other countries. Again it is likely that the trend of increasing numbers of overseas visitors is reflected in the trampers on the Mingha-Deception track.

Over the last several decades running has also become a prevalent activity on the Mingha-Deception track and for several months of the year the numbers of people running on the track may be equal to, or greater than those tramping. The prevalence of running on the track is due to the Speight's Coast-to-Coast multi-sport event (hereafter referred to as the Coast-to-Coast), which has been held annually in February since 1983 (see plate 3.7). The mountain run section of this event is held on the Mingha-Deception track. In addition to running the track during the event, many

competitors train on the track one or more times prior to the race. It can be assumed that nearly all runners on the track run from the Deception end to the Mingha, as this is the direction in which the event runs. Running on the track is also concentrated in the months leading up to the Coast-to-Coast. Data from seven surveys of Coast-to-Coast competitors shows that the majority of training runs (89 percent) take place from December to February (Norton & Stilwell, 2004). It is likely that the majority of runners on the Mingha-Deception track are from New Zealand as this is where the majority of participants in the Coast to Coast are from.

Plate 3.7: Competitors heading into the Deception valley during the 2006 Coast-to-Coast event

3.3.2 Social Impacts

The Coast-to-Coast event and associated training running has been occurring on the Mingha-Deception track for over two decades and many now consider mountain running a legitimate and important recreational activity in the area. Questions have been raised in the past, however, regarding the appropriateness of activities such as the Coast-to-Coast in national parks (Corbett, 1995), and concern regarding impacts

of the event and training running is ongoing. One of the major issues is conflict between runners and trampers on the track. A voluntary training running ban placed on the track by the Department of Conservation heightened conflicting public opinion regarding whether training running was or was not appropriate (see "Coast to Coast" 2001 and "Curbs on Runners" 2000). Training running is no longer banned, but questions over the possible displacement of trampers and the conflict between user groups owing to the Coast-to-Coast and training running still exist, and these were raised in the 2006 Arthur's Pass National Park Management Plan Draft (Department of Conservation, 2006).

Impacts associated with the Coast-to-Coast and running are not the only impacts of concern on the Mingha-Deception track. The track is also well utilised by trampers and is subject to similar social impact pressures as other tracks in New Zealand's natural environment. The extent of impacts such as crowding, conflict and displacement as well as visitor dissatisfaction with facilities on the Mingha-Deception track is unknown. All users of the track, not only runners, will influence such impacts.

3.3.3 Impacts Research

The main impacts research on the Mingha-Deception track has been carried out in conjunction with the Coast-to-Coast. A social impact assessment of the effects of the event carried out in 1993 found that most trampers who participated in the study were not bothered by runners on the track, although up to 20 percent did report being bothered by runners or changing their plans to visit the track owing to running on the track (Judkins & Norton, 1994). Annual reports (Norton, 1989; 1995; 1996; 1997;

Norton & Stilwell, 1998; 1999; 2000; 2001; 2002; 2003; 2004; 2005) outline results of environmental impact assessments undertaken each year. While discussion is focused on the effects of the Coast-to-Coast and associated training running, the reports provide a time series of environmental data for the track. Since 1989, social impact assessments, which assess the effects of the event and training running on other track users, have been completed in selected years. Results indicate that few track users (non-runners) are bothered by the presence of runners on the Mingha-Deception track (Norton & Stilwell, 2004).

Other than the reports discussed above, there is virtually no visitor impacts research focusing specifically on the Mingha-Deception track. One study (Palmer, 1979) looked at visitor impacts to some degree but is now well out of date. There is, therefore, a gap in the knowledge regarding social visitor impacts occurring on the Mingha-Deception track. Results from this research will help fill this gap and will provide benchmark data relating to visitor use and social impacts on the track.

Chapter 4: Research Methods

4.1 INTRODUCTION

This chapter outlines the methods used to examine the LAC planning process and the way in which LAC may be used as a framework for identifying levels of acceptable visitor impact conditions in New Zealand's natural areas. This is done by applying a LAC process to a case study of the Mingha-Deception track and analysing the success of the methods used. Section 4.2 discusses the LAC process as it applies to this research. The rationale for choosing the Mingha-Deception track as a case study location for investigating the LAC process is given in section 4.3. Sections 4.4 (stakeholder interviews), 4.5 (visitor surveys) and 4.6 (stakeholder survey) provide a detailed outline and discussion of the methods used in each of the data collection stages in this project.

4.2 LIMITS OF ACCEPTABLE CHANGE

The LAC planning process provides the framework for data collection and analysis in this research. LAC is a visitor management framework that focuses on the desired conditions and acceptability of impacts in natural areas and has been outlined in detail in Chapter 2. This research is based on the LAC-based research of Wray et al., (2005) and Kazmierow (1996) and includes three basic stages of the LAC process; identifying the values, issues and concerns for a site, measuring current impact conditions, and defining levels of acceptability for these conditions and comparing those that currently exist. Each of the three stages of data collection is linked to previous stages and is outlined briefly in table 4.1. A detailed description of the methods used in each stage is provided in the remainder of the chapter. The later

stages of the LAC process (such as deciding upon and implementing management strategies and ongoing monitoring and evaluation) did not form part of this research.

Table 4.1: Overview of the methods used in each stage of the LAC process in this research.

Stage	Overview of Methods Used
1: Identify area values, issues and concerns	Stakeholders were interviewed to identify the values, issues and concerns held for the Mingha-Deception track. These values, issues and concerns informed the development of the visitor survey (stage 2)
2: Measure current impact conditions	Current social and perceived biophysical impact conditions occurring on the Mingha-Deception track were measured through an on-site survey of visitors to the track in the summer of 2005/2006 and a mail-out survey of past visitors to the track
3: Define levels of acceptability and compare with existing conditions	Stakeholders were surveyed to measure levels of acceptability for the main visitor impact conditions, which were measured in stage 2. Resulting acceptability levels were then compared to current conditions to see if the impact levels currently occurring were acceptable

4.3 RATIONALE FOR CHOOSING THE STUDY SITE

This study uses the Mingha-Deception track as a case study location for the trial of a LAC-type methodology that incorporates stakeholders to decide what levels of social impacts are acceptable in natural environments. The Mingha-Deception track was chosen as a case study location because there are clearly issues surrounding visitor use of the track, largely attributable to the use of the track for the Coast-to-Coast. Increases in tramper numbers may also have contributed to visitor impacts on the track. Concern over visitor impacts such as crowding, conflict and displacement is ongoing and there is a clear need to examine whether and to what extent these impacts are occurring on the track. The application of the LAC process used in this research provides useful information regarding social impacts occurring on the Mingha-Deception track and whether these fall within currently acceptable impact levels.

4.4 STAGE 1: STAKEHOLDER INTERVIEWS

In order to explore the values, issues and concerns held by stakeholders for the Mingha-Deception track, qualitative interviews were conducted. In this study, stakeholders have been broadly defined as individuals or representatives of organisations who would affect or be affected by changes in management of the Mingha-Deception track, or who have a strong interest in the area. Stakeholders include Department of Conservation managers and relevant members of the public. The purpose of stakeholder interviews was to include both managers and the public in identifying and providing an understanding of the various values, issues and concerns held for the Mingha-Deception track.

Qualitative interviews were selected as the tool for investigating this stage for two reasons. First, interviews were successfully used in the identifying issues stage of the LAC work carried out by both Kazmierow (1996) and Johnson et al., (2001). Second, qualitative interviewing proceeds as a guided conversation where the interviewer aims to draw out detailed material from the interviewee (Lofland & Lofland, 1995) and should provide a comfortable environment for stakeholders to discuss sensitive or controversial issues (such as conflict owing to the Coast-to-Coast) surrounding the Mingha-Deception track.

This study did not include all people or organisations with an interest in the Mingha-Deception track. Rather, the intention was to interview representatives from the major stakeholder types identified (see table 4.2), in order to gain a variety of perceptions on the values and issues for the area. The types of stakeholders selected by Wray et al., (2005) and Johnson et al., (2001) were used as a guide for the

stakeholder groups selected for this research. Stakeholders to be contacted for interviews were initially selected from obviously interested parties such as relevant Department of Conservation staff. Snowball sampling, whereby initial contacts are used to suggest further contacts (Babbie, 2004) was used to identify additional participants.

Stakeholders were contacted and interviews conducted between October and December 2005. Throughout the interview period, a total of 14 stakeholders were identified, contacted by telephone and email (13) or letter (1), and asked to participate in the project by way of an interview (see table 4.2). Thirteen responded (no response was received from the stakeholder contacted by letter despite a following letter being sent) and 11 agreed to be interviewed. One participant who agreed to be interviewed was too busy for a formal interview when the researcher arrived and only had time to 'chat', so a total of 10 formal interviews took place. Two of the stakeholders who responded declined to be interviewed due time pressures. One of these (a conservation organisation) had time for a brief discussion over the telephone. The second (a local iwi group) agreed to participate in writing and was mailed the research questions (from the interview guide, appendix 1). Several follow up actions were undertaken by the researcher (telephone calls, letters) but no further response was received.

Table 4.2: Stakeholders contacted and interviewed

Stakeholder type	**Number contacted**	**Number of replies received**	**Number of formal interviews conducted**	**Number of informal discussions**
DOC manager	3	3	3	0
Concessionaire	3	3	3	0
Local resident/ accommodation provider	2	2	1	1
Local council	1	1	1	0
Local iwi	2	1	0	0
Conservation organisation	1	1	0	1
Track user (tramper)	1	1	1	0
Track user (runner)	1	1	1	0
Total	**14**	**13**	**10**	**2**

The formal interviews in this research were semi-structured (appendix 1) and lasted between 30 minutes and one hour. Interviews covered general themes, including the importance and values of the Mingha-Deception track to the interviewee and any issues or concerns they had regarding visitor use of the track. While these two themes were common to all interviews, the subjects discussed in each interview varied significantly depending on the interests of the interviewee. Interviews were tape-recorded (with the participants' consent) and the researcher made notes throughout the interview. Participants were given a research information sheet and signed a consent form (appendices 2 and 3). Notes were made during and following the two informal discussions. As information sheets were not given and consent forms not signed, data collected from these situations has not been used directly in the presentation of results. However, these informal discussions added to the researcher's knowledge and understanding of the values and issues surrounding the Mingha-Deception track.

4.4.1 Analysis of Stakeholder Interviews

Interviews were transcribed as soon as possible following each interview. Interview transcripts were then coded into themes using the cut and paste function in Microsoft Word. Themes (for example crowding, conflict, Coast-to-Coast issues) were developed based on the content of the interviews, and each represented discussion relating to a particular value, issue or concern for the Mingha-Deception track. The themes identified through the stakeholder interviews were used to gain an understanding of the value and significance the Mingha-Deception track holds for various stakeholders, as well as to identify the particular issues and concerns surrounding visitor use of the track. The values, issues and concerns identified through stakeholder interviews are presented and discussed in chapter 5.

4.4.2 Stakeholder Anonymity in the Presentation of Results

Stakeholders for natural areas in New Zealand can often be easily identified despite not being named. In this research, for example, the neighbouring communities and interest groups of the Mingha-Deception track are small in number, and providing stakeholder profiles means it is likely that some stakeholder participants in this stage of the research could be identified. Although all stakeholders who were interviewed consented to their stakeholder type being revealed (see appendix 3 for consent form), the views and quotes presented in the results are not linked with any particular stakeholder type to ensure the confidentiality of each individual participant's opinion. This does not compromise the LAC process in any way. The focus of this stage of the research is to identify the range of values, issues and concerns that are held by stakeholders for the Mingha-Deception track, not to identify which stakeholders hold

which views. Therefore stakeholder anonymity in regard to the views they hold can be preserved while still meeting the objectives of this stage of the LAC process.

4.4.3 Identification of Indicators

The issues and concerns identified through the stakeholder interviews form the basis of the visitor and stakeholder surveys, which were undertaken to measure the current state of visitor impact conditions on the Mingha-Deception track and determine acceptability standards for each condition. To do this, indicators of impact conditions needed to be specified. Indicators are measurable variables that singly or in combination indicate the condition of an issue or concern (Nilsen & Taylor, 1997).

Because all impacts measured in this study related to social issues and visitor perceptions, the percentage of visitors experiencing each impact was used as the indicator of that impact. Eleven indicators were established based on the key issues and concerns of stakeholders. Issues and concerns and their corresponding indicators are outlined in Table 4.3.

Table 4.3: Issues, Concerns and Indicators for the Mingha-Deception track.

Impact category	Issue/concern	Indicator*
Social impacts	Conflict	% of visitors being bothered by other visitors or large groups
	Displacement	% of visitors being put off visiting track due to activities other than their own
	Crowding	% of visitors experiencing some degree of crowding
Biophysical impacts	Track/vegetation damage	% of visitors bothered by track widening
		% of visitors bothered by vegetation damage
		% of visitors bothered by human toilet waste
Track/facilities impacts	Extent of formed track	% of visitors who think more sections of formed track/boardwalk are needed
	Provision of facilities	% of visitors who think more directional signage is needed
		% of visitors who think more huts/bivouacs are needed
		% of visitors who think there are insufficient toilets on the track
	Standard of track/facilities	% of visitors who comment negatively on the standard of the track or facilities

*All indicators relate to visitor experiences during their visit to the Mingha-Deception track.

4.5 STAGE 2: VISITOR SURVEYS

The second stage of data collection involved a quantitative survey of past and present visitors to the Mingha-Deception track. The purpose of this stage was to investigate the current impact levels occurring on the track as well as those which had occurred in the past. The different impacts investigated through the survey were based on the issues and concerns raised regarding visitor use of the track through the stakeholder interviews. Due to the focus of this research on social impacts, biophysical impacts are measured only in terms of how visitors perceive these impact conditions and whether they are negatively affected by them, rather than the actual extent to which each biophysical impact is occurring. Two concurrent surveys were run; an on-site

survey of visitors using the Mingha-Deception track during the 2005/2006 summer, and a postal survey of past visitors to the track.

4.5.1 On-site Visitor Survey

The on-site visitor survey was conducted using self-administered questionnaires (appendix 4) distributed to visitors at the start or end of their trip on the Mingha-Deception track. The researcher was stationed at either end of the track for approximately 7-10 hours per day for 20 days between16 January 2006 and 06 March 2006. Research was undertaken at this time to coincide with peak summer use of the track and to make sure data was collected both before and after the Coast-to-Coast event (see chapter 3, section 3.3). Four days (two weekend days and two weekdays) were spent at the Deception track end and 16 days (7 weekend days and 9 weekdays) were spent at the Mingha track end.

Purposive sampling was used in this survey in an attempt to gain as many respondents as possible. Owing to the lack of data on use levels and patterns on the Mingha-Deception track (see chapter 3, section 3.3.1), decisions on where and when to collect data were based on the researcher's judgment and the best information available. For example, the researcher had to use her 'best guess' based on the first few days fieldwork at each end of the track to decide how many days to spend at each end of the track. The higher number of days at the Mingha track end was due to the high number of people using only the Mingha (and not the Deception) entry point to the track (for example people on return trips to Goat Pass Hut from the Mingha track end or people entering/exiting a section of the Mingha-Deception track from the Mingha track end and another location such as the Edwards Valley or Temple Col). The days

of the week on which data collection took place were also largely a result of the first week of fieldwork. While weekend use was substantial, some weekdays received little use therefore it was decided to collect data on all weekends during the study period (except the weekend of the Coast-to-Coast event) and a selection of weekdays.

All visitors entering or exiting the Mingha-Deception track through the car parks at the track ends during the time the researcher was there were approached. People who were visiting the track for less than two hours were not asked to participate, as they did not see much of the track. People walking for less than two hours were generally people waiting at the Mingha track end for someone who was running the track, or tourists who stopped for a quick walk. Those walking/running for more than two hours on the track were asked to participate in the project by completing a questionnaire.

Participants either completed the questionnaire on-site and handed it back to the researcher, or were given a reply-paid envelope to enable them to complete the questionnaire at a later date and mail it back. The mail-back option was included as many people were approached at the beginning of their trip so could not yet complete the questionnaire. This option was also useful for people who were willing to participate but did not have time to complete the questionnaire at the track end. Participants who took the mail-back option because they had not yet completed the track generally left their questionnaires in their cars or carried them on the track (questionnaires were distributed in plastic bags to protect them from getting wet). Five runners who did not have cars to leave the questionnaires in and did not want to

carry them gave the researcher mailing addresses and were each mailed a questionnaire with a reply paid envelope.

Participants were also given a research information sheet (appendix 5), which shared a code with their questionnaire. This meant that all questionnaires could be identified and, if necessary, participants could request that the information they had provided be withdrawn from the study by providing their code. No participants exercised this option.

In total, 258 people were approached by the researcher and asked to participate in the research. The questionnaire was completed on-site by 88 people and a further 169 questionnaires were given to people to mail back. Only one person did not agree to participate, saying they felt too tired to complete the survey and that it would take too long. Ninety-six of the mail-back questionnaires were returned giving a mail-back response rate of 57 percent and an overall response rate of 71 percent. These response rates compare well with those of other visitor research in Arthur's Pass National Park. For example, Espiner (1995) received a response rate of 60 percent in his survey of visitors in the Park. Of the 184 questionnaires that were returned in the current study (on-site or mailed back), four were incomplete (two due to the visitors accidentally going up the Edwards Valley rather than the Mingha, two due to visitors only walking 30 minutes on the track). This resulted in 180 completed and usable questionnaires.

4.5.1.1 Challenges Encountered

Designing and carrying out a quantitative survey in a backcountry environment can be challenging and this study experienced limitations typical to backcountry visitor

research. The primary problem when surveying visitors in backcountry areas is obtaining a representative sample of an unknown population (Espiner, 1995). Visitor use of natural areas is can be spatially and temporally dispersed and there is often little data outlining use patterns on which researchers can base their data collection times and locations. Visitor contacts (by the researcher) in backcountry areas can also be low and this can make it difficult to obtain a sample that is both large enough and representative difficult. Ideal quantitative methods are often compromised in natural areas due to the difficulties of sampling in these places. Despite these difficulties, surveying on a range of days over a six-week period meant that the sample obtained in this research was large enough to be indicative of visitor impact conditions on the Mingha-Deception track during the study period.

4.5.2 Survey of Past Visitors

Alongside the on-site survey, past visitors to the Mingha-Deception track were also surveyed. The main purpose this survey of past visitors was to look at the issue of displacement, which is difficult to measure in on-site visitor surveys (see Chapter 2, section 2.2.3), as well as to examine whether the responses of past visitors varied significantly from those of present visitors.

Survey participants were recruited via a letter (appendix 6) that was sent to the editors of major newspapers and *New Zealand Wilderness Magazine,* and emailed to the tramping clubs listed on the *Federated Mountain Clubs* website (Federated Mountain Clubs, 2005). The majority of tramping clubs contacted distributed the letter to members via email and club newsletters and it was printed in the *New Zealand Wilderness Magazine*. The full extent to which the letter was printed and distributed

is not known as newspapers and some tramping clubs did not respond to indicate whether the letter would be printed/distributed or not. The intention of the letter was to explain the project and ask people who had visited the Mingha-Deception track, and were willing to participate, to contact the researcher by email or post with a mailing address. Those who responded were mailed a questionnaire, information sheet and reply-paid envelope. The questionnaire and information sheet were the same as those used in the on-site survey (appendices 4 & 5) and coded in the same manner. Of 15 surveys that were distributed to past visitors, 14 were completed and returned.

4.5.2.1 Limitations of the Survey of Past Visitors

The small number of participants in the survey of past-visitors, the range in times participants visited the track (1998-2005), and the fact that no overseas visitors were included means that the participants in this survey cannot be considered to be representative of visitors to the Mingha-Deception track prior to 2006. Participants in this survey are also likely to hold strong views regarding the track as they made the effort to respond to non-direct invitations (that is, requests made via tramping clubs, newspapers and a magazine, rather than to individuals) to participate in the research. While the results of the survey of past visitors provide indications of past visitor conditions on the Mingha-Deception track, significantly more research would be required to verify the findings of this survey.

4.5.3 Analysis of Visitor Surveys

Data from the on-site and past visitor surveys were entered and analysed using the statistical computer programme, SPSS. Descriptive statistics were largely used to

present results. Percentages in the results were calculated based on the number of participants who responded to each question (some participants did not answer all questions). The number of missing cases were few however, meaning they should have little impact on the results presented.

The on-site survey data were analysed as a whole as well being broken down into sub-groups (different user types) so comparisons between the groups could be made using a chi square analysis. The data from the on-site survey and the postal survey of past visitors were analysed as two separate samples and results compared using a chi square analysis to assess whether there were significant differences between the impacts experienced by current visitors and those who had visited the track in the past.

Current impact levels for all of the main visitor impact issues (except displacement) identified through stakeholder interviews were calculated based on data from the on-site visitor survey only. These levels were later compared with stakeholder evaluations of the acceptability of impacts (see section 4.6). Data from the survey of past visitors were not included in the calculation of current impact levels because these data referred to site visits dating back as far as 1998, and as such could not be considered 'current'. Data from the survey of past visitors were used in order to gauge the presence of displacement, and compared with the stakeholder acceptability level for this impact condition.

As multiple comparisons (between user type/survey type and 13 impact variables) were tested in this research a bonferroni correction was applied to correct the problem

of alpha inflation. Alpha inflation occurs as conducting multiple statistical tests on the same dataset increases the chance of making a type I error. To counter this, the alpha level below which associations can be regarded as significant can be lowered (Abdi, 2007). The bonferroni correction provides a formula for calculating the alpha level below which associations can be considered significant. Applying the bonferroni correction means that tests in this research will be significant below p=0.004.

4.5.4 Observations and Informal Collection of Visitor Data

During the on-site visitor survey, the researcher made observations of and engaged in many conversations with, people using the Mingha-Deception track and other tracks in the area, people who were waiting to pick up others using the Mingha-Deception track, and people stopping at the car park for other reasons. These conversations and observations often provided additional qualitative data which enriched the researcher's understanding of different perspectives on issues surrounding visitor use of the track. Reference is made to comments made in conversations at the track end, or observations made by the researcher, where they add value to the formal results being presented.

4.6 STAGE 3: STAKEHOLDER SURVEY

The purpose of the stakeholder survey was to assess the levels of acceptability of the impact conditions occurring on the Mingha-Deception track. To do this, standards (called acceptability levels in this thesis) were required, against which indicator conditions could be judged as acceptable or not. For example, an acceptability level for crowding may be 'no more than 30 percent of visitors experiencing crowding'. To

set acceptability levels for social and perceived biophysical impacts on the Mingha-Deception track, a quantitative survey of stakeholder perceptions was undertaken. While previous LAC-type research in New Zealand (Kazmierow, 1996; Wray et al., 2005) has used focus groups for this stage of the process, a mail-out survey was trailed in this study to try and include a wider range of stakeholders in setting acceptability levels.

Stakeholder contacts for the survey were gained from a Department of Conservation list of organisations and individuals who might have an interest in Arthur's Pass National Park. The list included concessionaires, telephone listings for Arthur's Pass and Otira, submissions databases, the Arthur's Pass Association listings, the Arthur's Pass National Park 75th anniversary list, and local iwi groups. All stakeholders who had been interviewed in stage one and had agreed to participate in stage three were also included in the survey. Stakeholder types represented in the results, based on the groups in which each stakeholder indicated they belonged, are shown in table 4.4.

Table 4.4: Stakeholder types represented in survey results

Stakeholder type	Number of times represented*
Track user: tramper	55
Track user: runner	11
Track user: hunter	9
Track user: climber	14
Track user: other**	2
Concessionaire	1
Department of Conservation	2
Local/regional council	2
Iwi	1
Arthur's Pass area accommodation provider	2
Other Arthur's Pass area business	1
Arthur's Pass area resident	2
Arthur's Pass area bach holder***	33
Tramping/outdoors club	22
Conservation organisation	1
Other****	3

*Many survey respondents are included in more than one category as they indicated they represented more than one stakeholder type.
**Other track users included a photographer and a search and rescue worker.
***A bach is a small and usually basic New Zealand holiday cottage.
****Other stakeholders included a scientist who works in alpine areas, a former Arthur's Pass Park Board member and a former Department of Conservation worker.

Stakeholders in the survey were mailed a letter (appendix 7) requesting their participation in the survey and outlining the research, a questionnaire (appendix 8) and a reply-paid envelope. These were coded in the same manner as the visitor survey and the letter advised participants they had two weeks to withdraw the information given in their questionnaire from the project. No stakeholders requested their information be withdrawn. The questionnaire presented 11 impact scenarios and stakeholders were asked to rate the acceptability level of a variety of conditions in each scenario.

The initial mail-out to 254 stakeholders took place in the last week of January 2006. Stakeholders who had not responded within a month (182) were re-sent the questionnaire, reply paid envelope and information letter (slightly modified to ask

them to send in the questionnaire if they had not already done so). In total, 127 responses were received, representing an initial response rate of 50 percent. However 45 of those responding declined to participate in the study. The majority of these indicated they were unable to participate as they had never visited the Mingha-Deception track or had not visited it for many years. Six questionnaires were returned to the sender by New Zealand Post and 10 were returned incomplete and were unable to be used. Sixty-six completed questionnaires were returned from the 254 stakeholders contacted, representing a usable response rate of 26 percent.

4.6.1 Limitations

The useable response rate to the mail-out survey of stakeholders in this research was somewhat lower than is generally expected. For example, Babbie (2004) suggests that a survey response rate of 50 percent is adequate for analysis. The low response rate in the stakeholder mail-out survey in this study can be attributed, in part, to the method of identifying stakeholder contacts.

Many of the contacts included in the survey may have not been relevant stakeholders for the Mingha-Deception track. This is because the Department of Conservation list, which was used to find contacts, represented people and organisations with interests in Arthur's Pass National Park rather than specifically the Mingha-Deception track. That many of these contacts may not have been relevant stakeholders for this study was indicated by the high number of respondents declining to participate because they had never visited the Mingha-Deception track or knew little about the track. If these contacts had not been included in the survey the response rate would have been

higher, therefore using the Department of Conservation list to gain contacts for the survey was not ideal. However it provided the best available method of contacting people who were likely to have an interest in the Mingha-Deception track.

A second limitation that contributed to the low response rate in the stakeholder survey related to difficulties in effectively communicating the purpose and intent of the survey. Although the purpose of the survey was outlined at the beginning of the questionnaire, comments on several questionnaires (both completed and incomplete), and queries made by phone and email (to the researcher and supervisors), suggested that some people found the questionnaire confusing and did not understand its purpose. The main problem appeared to be with stakeholders not understanding that the responses they gave should rate how acceptable they felt various visitor impacts were on the Mingha-Deception track, rather than guessing what impacts were actually occurring or how acceptable visitors on the track might think the impacts were. Comments also suggested that some stakeholders did not think there was any benefit in them providing their acceptability ratings for impacts on the track. Confusion surrounding the stakeholder survey means some potential participants may not have completed the survey because they did not understand it or did not think that it was worthwhile.

The third limitation was that some stakeholder types were over-represented in the results. For example, 55 trampers were included in the results, while there was only one iwi representative included (see table 4.4). This was largely due to the researcher being unaware of the stakeholder type of the majority of contacts on the Department

of Conservation list used to identify contacts for this survey. Contacts were listed by name only, not by stakeholder group, so it is likely that varying numbers of representatives of different stakeholder types were invited to participate in the research. The over-representation of some stakeholder types provides for the possibility that the results will be skewed towards the views of particular groups. The extent to which stakeholder type affects individual participants opinion will be varied, and many participants in the stakeholder survey in this research indicated they belonged to several stakeholder types. This suggests that the results of this research can still be considered to provide an indication of stakeholder acceptability levels for impacts relating to visitor use on the Mingha-Deception track.

4.6.2 Analysis of Stakeholder Survey

Data from the stakeholder survey were entered and analysed in Microsoft Excel. Acceptability levels were established by calculating the mean acceptability ratings for each scenario in the questionnaire. Due to a small error in question 6 of the stakeholder questionnaire[1], the results presented may be less accurate for this scenario. The error was corrected in the second mail-out. It is likely that the majority of respondents did not notice the error due to the standard format of the questions; therefore any inaccuracy is considered minimal. Stakeholder standards were compared with actual conditions on the Mingha-Deception track (as measured in the on-site visitor survey) to determine whether they are acceptable or not. Results are presented in chapter 7.

[1] Question 6, scenario 5 read '90% of visitors think more tracks/boardwalks needed' instead of '90% of visitors think more huts/bivouacs needed'

4.7 CONCLUSION

This chapter has outlined the three-stage methodology that was used in this research to involve stakeholders in determining what levels of social visitor impacts are acceptable on the Mingha-Deception track. In stage one, stakeholders were interviewed to identify values, issues and concerns for the track. These informed the development of the visitor surveys conducted in stage two. The purpose of stage two was to measure current impact conditions occurring on the Mingha-Deception track (measured through the on-site visitor survey) and compare them with those that have occurred in the past (as measured in the survey of past visitors). The acceptability of visitor impact conditions on the track was measured through a survey of stakeholders in stage three, and resulting standards were compared with current conditions to determine whether acceptability levels are being exceeded.

The applicability of the LAC process and the methods used in this study to managing visitor use in natural areas in New Zealand is a key focus of this study. The results from each stage of data collection are presented and discussed in chapters 5, 6 and 7. The success of the methods used in each stage is discussed and compared with other LAC studies in New Zealand in chapter 8. This discussion will provide an analysis of the methods most suitable for using the LAC process to involve stakeholders in managing visitor impacts in natural areas in the New Zealand context.

Chapter 5: Identification of Stakeholder Values, Issues and Concerns

5.1 INTRODUCTION

The first stage in this LAC study involves outlining the importance and significance of the natural area under consideration and any issues surrounding visitor use of that area (see chapter 4, sections 4.2 and 4.4). The views and opinions of stakeholders form the basis of this assessment. This chapter presents the results of the stakeholder interviews undertaken as the first phase of research. The value and significance of the Mingha-Deception track to stakeholders is presented in section 5.2. Section 5.3 then outlines the issues and concerns that stakeholders have regarding visitor use of this track.

5.2 TRACK VALUE AND SIGNIFICANCE

Three major themes were identified through analysis of stakeholder interviews in regard to the value and significance of the Mingha-Deception track. These are the recreation opportunities provided by the track, the biodiversity values of the area, and the perceived economic benefits gained in the community due to visitor use of the track. Each of these themes is discussed below.

5.2.1 Recreation Opportunity

When asked about the values of the Mingha-Deception track, stakeholders most commonly commented on the recreation opportunities provided by the track. The Mingha-Deception track is clearly valued as a tramping route, and as the site of the mountain run section of the Coast-to-Coast event.

5.2.1.1 A Classic Tramping Route

The Mingha-Deception track is clearly regarded by stakeholders as a unique route within Arthur's Pass National Park and among South Island tramping tracks. One important factor is the range of vegetation and terrain through which the track passes, highlighting the diversity of the mountain environment. Eight stakeholders commented on the importance of the diversity of vegetation and landscapes traversed by the track. One stakeholder who discussed the value of the Mingha-Deception track in Arthur's Pass National Park, illustrated this point:

> I mean, it is a good track to actually see Arthur's Pass National Park because it covers all the things that the Park has got, because you go from east to west so it's got both sides of the bush, it's got a Canterbury side river, it's got the Deception which is a typical western side river.

Another stakeholder identified changes in scenery as a reason the Mingha-Deception holds personal value to him:

> I could say that the Deception-Mingha, I really like, 'cos it changes in scenery, going from the West Coast to Canterbury. And it's a very defined line of areas. Like in the Mingha there's all the beech forest which is definitely a Canterbury type forest, and so forth, and you've got the alpine stuff up the top.

As well as providing an opportunity to cross the main divide and view a diverse range of vegetation, it is evident that stakeholders value the Mingha-Deception track because it provides a relatively safe and accessible (from the main highway) yet challenging backcountry experience. In comparing the Mingha-Deception track to other alpine crossings in the area one stakeholder commented:

> It's sort of got a reputation as being a reasonably straightforward crossing. It's a low altitude pass, probably the lowest pass of all of the ones that are frequently walked, if you look at the Minchin, Goat Pass, then through to Harman Pass. [Of] those three passes, the Mingha-Deception trip does offer what is perceived in some ways as an easier option. It's more accessible.

Several other stakeholders commented on the level of skill required to complete the Mingha-Deception track and the degree of safety of the track. It is clear from stakeholder comments that the Mingha-Deception track is valued as a tramping experience that is attainable for the majority of people but still provides a challenging

environment and requires some level of backcountry skills. The following comment illustrated this view:

> There is still a level of skill required for the Mingha-Deception but it's not as high as some of the others, you don't have to be tremendously experienced, you need a level of experience but not tremendously experienced. The average person who has average skills, average fitness etcetera can undertake [the track] in two or three days, so for that reason it's important.

Despite the Mingha-Deception being valued as a relatively accessible and attainable tramping experience for most people, one stakeholder did regard it as a 'technical' and 'difficult' tramping track. Several stakeholders also expressed concerns about visitor safety on the track. These concerns will be discussed in section 5.3.3.

The overall sentiment of stakeholders in regard to the tramping opportunity provided by the Mingha-Deception track is summarised by one stakeholder who outlined the value of the track as a recreation opportunity:

> I guess the value [of the Mingha-Deception track] is that it really has iconic status because it is one of the classic tramping routes, you know, crossing of the main divide, and it's one of those opportunities that really is not beyond the ability of the majority of people. It's an important recreation opportunity within Arthur's Pass National Park. It has iconic status because it is either an east-west or west-east crossing of the divide.

Clearly, the opportunity to tramp in a backcountry environment which is both accessible and challenging, and provides the visitor the opportunity to pass through a range of vegetation and terrain while crossing the main divide, has earned the Mingha-Deception track the status of a classic tramping track. These opportunities are important values attributed to the track by stakeholders.

5.2.1.2 Coast-to-Coast

Many stakeholders value the Mingha-Deception track because of its association with the Coast-to-Coast. Stakeholders discussed the Coast-to-Coast both in relation to their own involvement in the event (as concessionaires running the event or providing guided training runs, and/or as competitors in the event), and in general, whether or

not they were personally involved with it. The Coast-to-Coast is considered to provide an important recreation opportunity and is viewed as a significant feature of the Mingha-Deception track. Only one stakeholder viewed the Coast-to-Coast negatively. This stakeholder however, accepted that the Coast-to-Coast has become a more or less permanent fixture on the track.

Several stakeholders indicated that the remote location and natural environment are significant features of the mountain run section of the Coast-to-Coast. They suggested that the rugged terrain, natural beauty and diverse environment were important to the mountain run. One stakeholder, for example, spoke of the Mingha-Deception track in terms of its appropriateness for the mountain run section of the Coast-to-Coast:

> It met all my expectations . . . of being both wild and untamed on the western side, and tracked on the eastern side. It was absolutely perfect.

Another stakeholder discussed why the remoteness was important to the mountain run section of the Coast-to-Coast. When asked if the terrain of the track was a draw-card to the event, she answered:

> Definitely, because it's remote. The good thing about running in the hills over uneven ground, is that you actually have to concentrate sometimes. You have to be alert, and it's varied. I think you get really strong . . . there's nothing better than being fit enough to run in the hills away from civilization, and you just feel strong. You know on a ridge top or when you can't hear cars and things like that and you're just completely at one. I mean tramping that kind of environment is pretty cool but actually running it, you're that much stronger.

Although this stakeholder's comment expands from talking about the Coast-to-Coast to mountain running in general, it illustrates the remote and challenging environment that is important in the Coast-to-Coast and therefore a significant value of the Mingha-Deception track.

As well as being important in providing a recreation opportunity, several stakeholders emphasised that the Coast-to-Coast has become a feature of the Mingha-Deception track. These stakeholders suggest that the Coast-to-Coast helps promote the track and draws trampers as well as runners to the track. One stakeholder spoke of people visiting the Mingha-Deception track because of the Coast-to-Coast, although not during the event:

> [People visit the track] just because you know, my brother's done it, I'm not into running but I'll tramp through and see what to see. I mean I speak to a lot of people here who actually come up to go through, just because they want to know where they run the Coast-to-Coast. It has actually helped to advertise the whole thing and get it off the ground, and even overseas people who've read about the Coast-to-Coast want to do it.

The Coast-to-Coast event (and therefore the track) is valued as it provides an important recreation opportunity in which the remote location and natural environment are significant. The Coast-to-Coast is also valued for its role in increasing awareness of the Mingha-Deception track and encouraging people to visit.

5.2.2 Biodiversity Values

While many stakeholders mentioned the opportunity to view a diverse range of vegetation as an important feature of the Mingha-Deception track, several also valued the area specifically as habitat for flora and fauna. Some species, including the blue duck, kiwi and native falcon that inhabit the Mingha and Deception valleys, the rata/kamahi forests in the Deception Valley and the alpine herb field on Goat Pass, were specifically named by stakeholders as important. The focus on specific species is illustrated by the following stakeholder when outlining important features of the track:

> In the case of the Deception, the rata/kamahi and cedar forests that are down through there, and also the other biodiversity, blue ducks, great spotted kiwis, quite a variety of bird life, that inhabit one or other or both sides of the main divide.

The Mingha-Deception track therefore, is valued not only for the recreation opportunities it provides but also because of the bird and plant species that can be found there.

5.2.3 Economic Benefits

Several stakeholders valued the economic flow-on effects from visitors to the Mingha-Deception track to surrounding areas. Some stakeholders spoke specifically of the Coast-to-Coast and the economic benefits of the event for the area:

> The Coast-to-Coast brings a fantastic amount of money, also all the spin offs from it, because there's people training already [in December], so you've got people camping up here [Arthur's Pass], you've got people stopping at the backpackers, you've got people stopping in motels, who are coming up for a weekend training run.

Others mentioned the value of flow-on effects for local businesses of all visitors to the track. For example one stakeholder talked of the economic value of track visitors to Arthur's Pass businesses:

> In a round-about way everybody makes money out of it. They [track visitors] all go to the Wobbly Kea [a café/bar in Arthur's Pass] the night they come out, they have a few beers, and they obviously buy their food and stuff from the shop. So in round-about terms, you know, you've got the shop, the Wobbly Kea, the taxi, the backpackers."

The Mingha-Deception track is valued for the perceived economic benefits it brings to surrounding areas, owing to the Coast-to-Coast and to visitor use of the track in general.

5.3 ISSUES AND CONCERNS

Three key themes were identified regarding the issues and concerns stakeholders have regarding visitor use of the Mingha-Deception track. These are social impacts, biophysical impacts, and track and facilities impacts. Stakeholder concerns for each theme are discussed next.

5.3.1 Social Impacts

Concerns were raised by all stakeholders about at least one of the three major social impact issues that were identified through the stakeholder interviews. These issues are conflict, crowding and displacement.

5.3.1.1 Conflict

Conflict appears to be a key issue for the Mingha-Deception track, as all stakeholders interviewed discussed conflict between runners and trampers. Stakeholders are divided, however, as to whether this conflict actually exists, or is an issue for concern. Some stakeholders believe that conflict is occurring between trampers and runners:

> [There will] always be a bit of conflict between the tramping people that don't do those events and people that do them. I mean they will say, look at those turkeys, and the other one's saying look at those turkeys, who wants to go tramping when you can run through here.

Conversely, some stakeholders clearly believe that conflict between trampers and runners is not an issue:

> I don't think there's any issues regarding any conflict between runners and trampers. . . Runners are very considerate people, you don't get a problem with that.

While some stakeholders have clear views as to whether conflict is occurring or not, some are not sure. When asked if he thought there was any conflict occurring on the Mingha-Deception track one stakeholder responded:

> It's certainly busy through that late December/January period, training going on, so there is conflict, particularly the international tourist wanting to undertake that [tramping track] and being met by [runners] . . . . I think for a lot of international people they're just sort of perplexed by it, they meet someone in their running gear and here they are carrying their pack. So there's a bit of, interaction, conflict is rather a strong word, but there's certainly some interaction.

While there is disagreement amongst stakeholders over whether or not conflict between runners and trampers exists, it is evident that it is an important issue regarding visitor use of the Mingha-Deception track.

A secondary issue regarding conflict on the Mingha-Deception track is related to group size. Two stakeholders raised concerns regarding conflict between track users in small groups and those in large groups, suggesting large groups on the track might be a problem. The following quote illustrates this concern:

> I mean there's nothing worse than going into a remote place and coming across twenty other people on the track at once, and I have seen in there [the Mingha-Deception track] some really big school groups. Don't get me wrong, I think it's really great that they're doing it, but they should do it in smaller groups.

There is clearly a small amount of concern regarding encounters between large groups and smaller parties causing conflict (regardless of whether they are runners or trampers) on the Mingha-Deception track.

5.3.1.2 Displacement

Related to the issue of conflict between runners and trampers is the concern that tramper displacement is occurring owing to the Coast-to-Coast and the training running that occurs before the event. The issue is that trampers may be choosing not to use the Mingha-Deception track during and prior to the Coast-to-Coast because they are put off by the number of people running the track. Four stakeholders suggested they thought displacement of trampers was probably occurring in the lead-up to the Coast-to-Coast and during the event. The extent of this displacement was unknown, as the following quote indicates:

> We know that there's some displacement. People steer clear of the area, especially over the Coast-to-Coast and also the build-up. We don't know how much is occurring in the build-up but we know that it certainly does occur.

Others were not concerned about tramper displacement, with one stakeholder suggesting that it may not be occurring:

> I've never heard people say, 'we're looking for a tramp', 'why don't you do the Mingha-Deception', 'we wouldn't go there because of the Coast to Coasters doing it'.

Whether or not tramper displacement is occurring is unclear. Stakeholder discussion of displacement however, indicates it is an issue related to visitor use of the Mingha-Deception track.

5.3.1.3 Crowding

Several stakeholders identified crowding as an issue on the Mingha-Deception track. The primary problem was crowding at Goat Pass hut with three stakeholders suggesting that this was cause for concern. One stakeholder, for example, indicated that rising visitor numbers made crowding likely at Goat Pass hut:

> I mean if the backpacker thing keeps on, you know, young people keep coming to this country and the figures go up every year, I think you'll probably get to the stage where Goat Pass hut is inadequate in size for those few summer months. Probably November through to March.

While Goat Pass hut was the primary location on the track that stakeholders discussed in relation to crowding, the possibility of crowding occurring on the track was also raised. The general sentiment is that it is not an issue. A comment from one stakeholder illustrates this:

> Those two valleys fit a whole lot of people and you'll always get an accumulation at the actual hut. But some people decide to leave at six and the lazy ones get up and motor off about 11 o'clock so everybody's going to be well spaced out. . . really it's not a problem.

This comment suggests that movement along the Mingha-Deception is one-way. This is not the case, especially during the lead up to the Coast-to-Coast event when runners travel in the opposite direction to the traditional Mingha to Deception tramping route. Despite this, it was suggested by some stakeholders that crowding on the track was not a problem even during peak use times leading up to the Coast-to-Coast as illustrated by the following comment:

> The people going through there are low numbers spread out over a wide distance. When it does come time for the Coast-to-Coast, you know around training time, especially December to January, there are a lot of people, but it's not like you see one every five minutes, it's spread out over quite a distance.

Crowding is an issue of concern for some stakeholders. Concern is primarily about crowding at Goat Pass hut, but generally stakeholders have little concern about crowding on the track.

5.3.2 Biophysical Impacts

Many stakeholders raised issues regarding the biophysical impacts visitors have on the Mingha-Deception track and the surrounding environment. The main issues are that visitors are damaging the track and surrounding vegetation, as illustrated in the following quote:

> You can see evidence of trampling, short cuts, those sorts of things . . . and then you've got widening of wet and muddy sections.

A central topic of discussion on this issue was whether the damage was being caused by trampers or runners and, as with previous impact issues, opinion was divided. Some stakeholders believe runners do more damage than trampers, while others hold the opposite view. A secondary biophysical impact of concern was the presence of human toilet waste on and around the track. Two stakeholders raised this issue and it was a particularly pressing concern for one who spent some time discussing the evidence of human toilet waste in the bush surrounding the track.

Several stakeholders also raised concerns regarding the bird life that inhabits the Mingha-Deception valleys, particularly the blue duck. Their concerns were related to predation by introduced species such as stoats and rats rather than disturbance by

visitors using the track. Some stakeholders noted that any problems of visitors disturbing the blue duck have been resolved by the re-routing of a section of track on the Mingha side to avoid an area of blue duck population. Because concerns relating to bird life identified through stakeholder interviews did not involve visitor disturbance, they are not included in the impacts being addressed in this research.

5.3.3 Track and Facility Impacts

Many stakeholders made comments regarding facilities provided on the Mingha-Deception track. Concerns related to the appropriate levels of development of the track and the quality of facilities provided. These issues were raised in terms of both visitor safety and visitor enjoyment and are discussed below.

One of the overriding concerns expressed by stakeholders related to the varying track standard throughout the Mingha-Deception track, and whether it should be upgraded to provide a more consistent level of development for the full length of the track. This concern is illustrated by one stakeholder's discussion of the varying levels of track standard:

> It is a mish-mash in terms of . . . following a river bed track half way up the Mingha, moving into a bush track for part of the trip. . . In the headwaters of the Mingha, crossing the stream and then essentially having boardwalk over all of the wetland areas up in the saddle area, and then suddenly, beyond Goat Pass hut, that ends, and it turns into a route. You know that's one of the most interesting aspects to me, is to determine whether people want it to stay pretty much as it is with a little bit of improved directional signage so that the cut out points in the river bed are very clear, or we move into some sort of upgrade.

Some stakeholders did not favour further development of the Mingha-Deception track, as the following comment illustrates:

> Leaving it in its natural state as much as possible is very important . . . . It's one of those pieces of New Zealand's country that should just be left the way it is . . . . I think it should be left alone really.

Other stakeholders favoured an upgrade of the track, including cutting more tracks in areas that currently have no defined track:

> That's all it [the track on the Deception side of Goat Pass hut] is, it's a river. When you get to the bottom of Goat Pass and climb up a riverbed, it's not a flat riverbed, this is a vertical riverbed, and in wet weather it's just a horror show. So there needs to be a zig-zag track, cut on the southwest side of the water course, through the bracken, descending from Goat Pass into the Deception valley.

Stakeholders also discussed whether further huts and shelters, directional signage and toilets needed to be provided. The provision of huts and directional signage was discussed primarily in terms of visitor safety, as some stakeholders held concerns over track users having difficulty following the track or being in danger if river levels rise rapidly. The number and location of toilets was discussed in terms of the amount of toilet waste in bush surrounding the track, with some stakeholders suggesting toilets needed to be installed at the track ends and other points along the track.

The quality of huts and toilets on the Mingha-Deception track was also discussed with several stakeholders suggesting that the standard of these facilities might not meet the needs of track users. For example one stakeholder commented on the poor standard of the toilet at the Upper Deception hut, saying:

> The toilet at the Orange [Upper Deception] hut, I mean most people would rather go in the bush than use the [toilet].

Stakeholders in general thought it was important to maintain the current facilities on the Mingha-Deception track.

5.4 CONCLUSION

A range of values, issues and concerns held by stakeholders for the Mingha-Deception track were identified through the stakeholder interviews undertaken in this research. Stakeholders value the track primarily for the recreation opportunities it provides, the perceived economic benefits for the wider community gained from visitor use of the track, and the biodiversity values of the area. Issues and concerns identified by stakeholders which relate to visitor use of the Mingha-Deception track, can be placed into three categories; social impacts, biophysical impacts, and the provision of facilities. The social impacts discussed include conflicts between trampers and runners and large and small groups, displacement of trampers owing to the Coast-to-Coast event and pre-event training, and crowding on the track and at Goat Pass hut. The biophysical impacts due to visitor use that were discussed by stakeholders were track widening and vegetation damage. Finally, stakeholders discussed the facilities provided on the Mingha-Deception track and raised issues surrounding the quality of the facilities currently provided and the extent to which the track should be developed to a consistent standard.

Chapter 6: Measurement of Visitor Impact Conditions

6.1 INTRODUCTION

In this stage of the research, visitor impact conditions on the Mingha-Deception track were measured through an on-site survey of visitors to the track during the 2005/2006 summer and a mail-out survey of visitors who had visited the track in the previous 10 years. The content of the visitor survey was based on the values, issues and concerns of stakeholders regarding visitor use of the track, which were identified in the first stage of the research. Results from the visitor surveys are presented and discussed in this chapter. Section 6.2 looks at the findings of the on-site visitor survey which measured current impact conditions occurring on the track in the summer of 2005/2006. Results are discussed in relation to the values, issues and concerns raised in stakeholder interviews. Section 6.3 presents and discusses results from the survey of past visitors. The main conclusions from both visitor surveys are drawn together in section 6.4.

6.2 ON-SITE VISITOR SURVEY: RESULTS AND DISCUSSION

This section discusses data collected from 180 participants on the Mingha-Deception track from mid-January to early March 2006. The aim of this survey was to measure current visitor impact conditions associated with visitor use of the track. The issues measured in this survey were identified through stakeholder interviews (see chapter 5). This section begins by profiling the participants in the survey and the characteristics of their use of the Mingha-Deception track. The results of the survey relating to social, biophysical and facility visitor impacts are then presented and discussed.

6.2.1 Visitor Profile

Consideration of the characteristics of the participants in the on-site visitor survey is important in understanding the results. The majority of participants in the survey were male (68 percent, n=122), while females made up 32 percent (n=56) of respondents. Participants ranged from under 20 to over 60 years of age, with over half (59 percent, n=105) aged between 20 and 39 years. Participants were highly educated with the majority (79 percent, n=140) having some form of tertiary education and over half (53 percent, n=94) holding a bachelor's degree or post-graduate qualification. Participant's occupations were varied, with the majority falling into the professional category (see figure 6.1). Seventy six percent (n=137) of participants were from New Zealand, 22 percent (n=40) were from overseas, and one percent (n=2) indicated they were from both New Zealand and overseas. Most New Zealand visitors were from the Canterbury region and the majority of overseas visitors were from the United Kingdom and Europe (see figure 6.2).

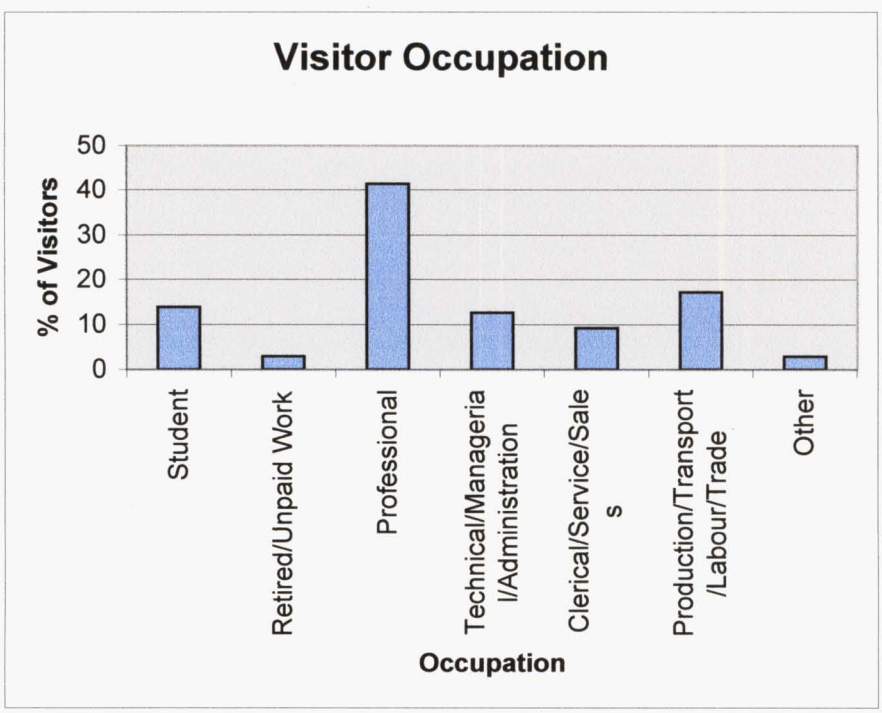

Figure 6.1: Occupation type of participants in the on-site visitor survey (n=174)

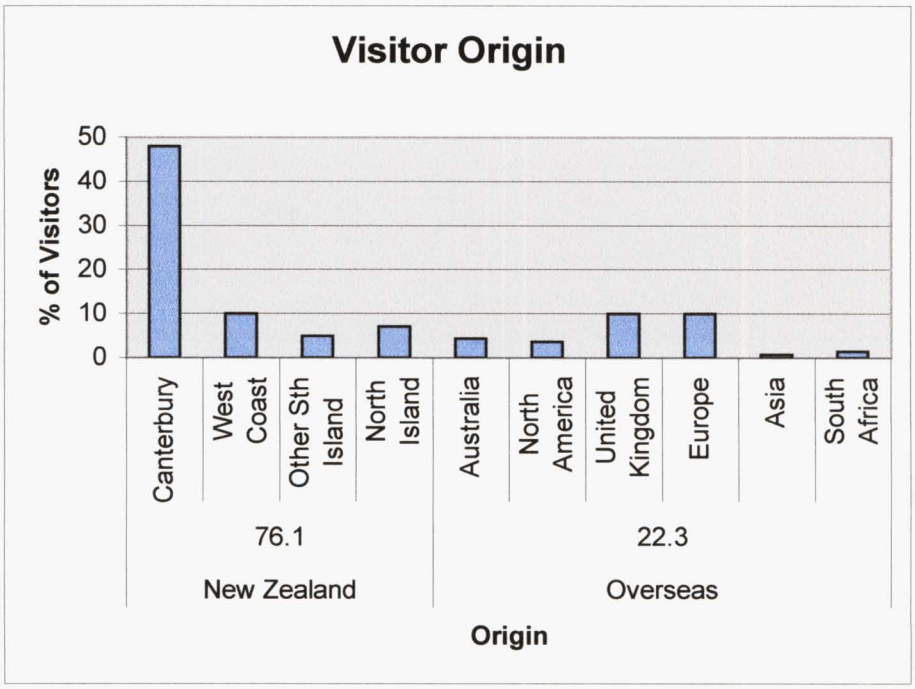

Figure 6.2: Origin of participants in the on-site visitor survey (n=179)

While the sex, age, education and occupation of visitors in this survey generally match the characteristics ascribed to outdoor recreationists in New Zealand (Booth & Peebles, 1995), there is one important feature of participants in the current study that differs. Over half (54 percent, n=96) of the participants in the on-site visitor survey were people running on the track (hereafter referred to as runners). While mountain running does occur in other areas, the high proportion of participants in the current study who were runners can be attributed to the Coast-to-Coast event.

The high number of runners represented in the on-site visitor survey in this research has affected the proportion of overseas visitors. Research in 1995 (Espiner, 1995) showed that the majority of visitors to Arthur's Pass National Park were from overseas. This is not represented in the current study where 76 percent (see figure 6.2) of visitors to the Mingha-Deception track were from New Zealand (mostly from the Canterbury region). Categorising participants by user type shows that nearly all

runners (94 percent, n=89) were from New Zealand. Trampers were more evenly distributed, however more than half (54 percent, n=41) were from New Zealand. This suggests that differences in the proportion of New Zealand and overseas visitors using the Mingha-Deception track and Arthur's Pass National Park in general can be explained by the high number of runners represented in results from the current study.

The timing of the present visitor survey may also have affected results. As outlined earlier (see chapter 4, section 4.5.1.1) sampling in backcountry environments can be difficult. To obtain maximum possible contacts with visitors, the on-site visitor survey was conducted from mid-January to early-March 2006. This period falls within the summer, when the track receives its highest use levels. It also covers four weeks leading up to the Coast-to-Coast when there are high numbers of people training for the event on the track. Visitor impact levels are likely to be higher during this time due to higher use levels and different user types on the track.

The time the on-site visitor survey was carried out, and the unique make-up of participants in the survey means that results represent conditions on the track only during the survey period. The same survey undertaken at different times of the year would likely produce different results.

6.2.2 Trip Information

Participants in the on-site visitor survey were grouped into user types based on the activity they listed as their main activity during their trip on the Mingha-Deception track. The majority of participants were runners (54 percent, n=96) and trampers (43 percent, n=76). Other participants in the survey (3 percent, n=6) included one hunter,

one climber, one person undertaking nature study and three people who listed both tramping and running as their main activity type. The composition of track users changed after the Coast-to-Coast. Eighty three percent (n=147) of participants in the survey visited the track prior to the Coast-to-Coast. Runners were the largest user group during this time. In contrast, of the 17 percent (n=31) of visitors surveyed after the event, trampers were the primary (61 percent, n= 9) user group (see figure 6.3).

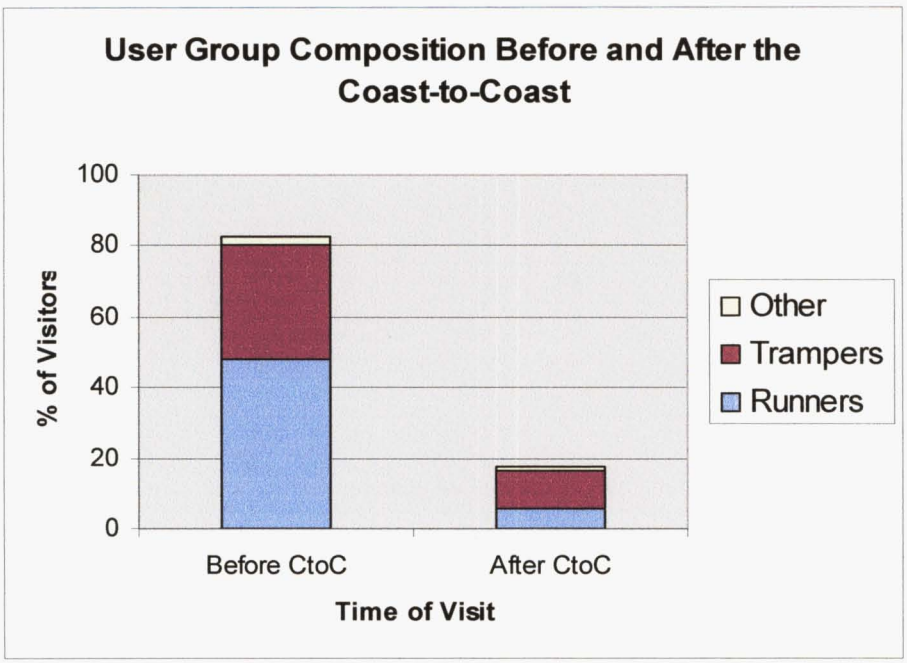

Figure 6.3: Composition of user type of participants in the on-site visitor survey before and after the Coast-to-Coast (n=178)

Figure 6.4 shows the routes taken on the Mingha-Deception track by participants in the on-site visitor survey. A clear majority travelled from the Deception to the Mingha end, while only 16 percent of followed the traditional Mingha-Goat Pass-Deception route.

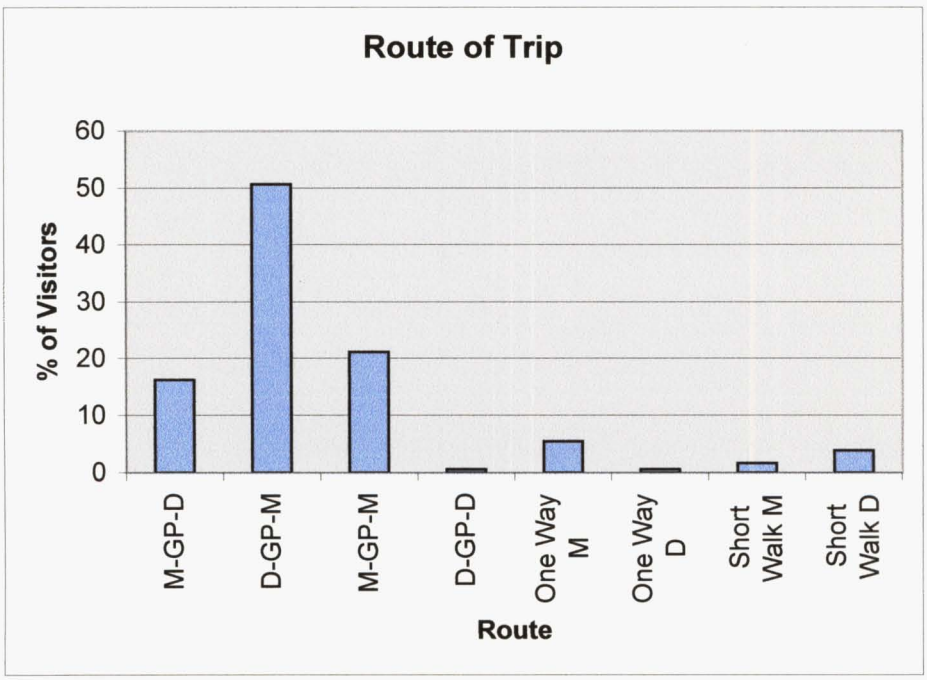

Figure 6.4: Route of trip of participants in the on-site visitor survey. M=Mingha, GP=Goat Pass, D=Deception. One-way means the visitor used a section (M or D) of the track in one direction as part of their trip along with another route such as Lake Mavis/Edwards Valley or Temple Col (n=180)

Figure 6.5 shows that most runners travelled the Deception-Goat Pass-Mingha route. This is because the Coast-to-Coast event travels in this direction. Trampers and other users travelled a variety of routes, with the majority of trampers travelling up the Mingha to Goat Pass and back down the Mingha.

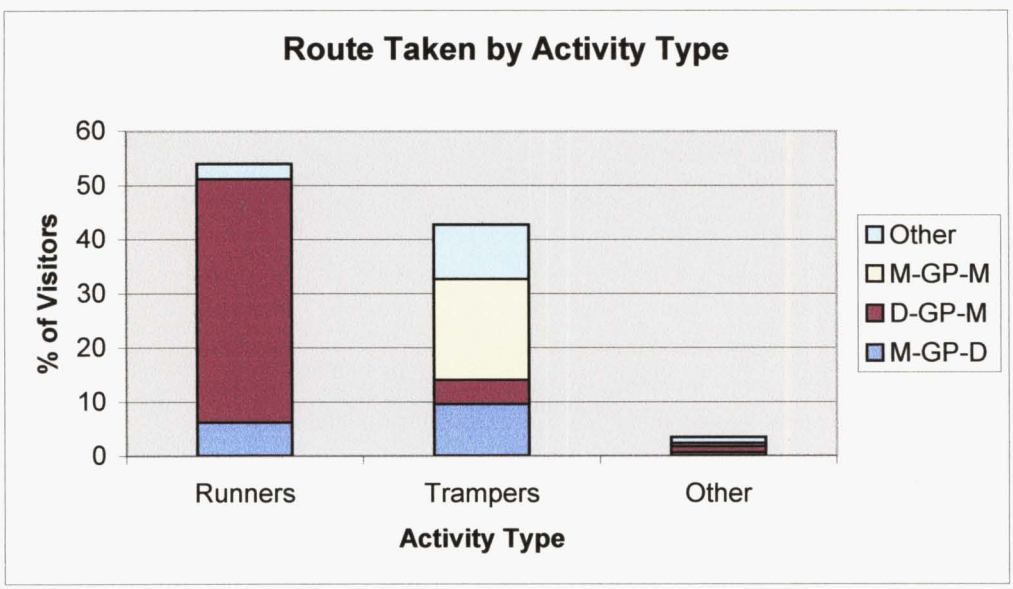

Figure 6.5: Routes taken within each user group (n=180)

The majority of visitors (66 percent, n=119) did not stay overnight on the Mingha-Deception track during their trip. Of the 34 percent (n=61) of the on-site survey participants who did stay overnight on the track, most stayed in Goat Pass hut (see figure 6.6). All visitors who had overnight stays were trampers or other users. No runners stayed overnight on the Mingha-Deception track.

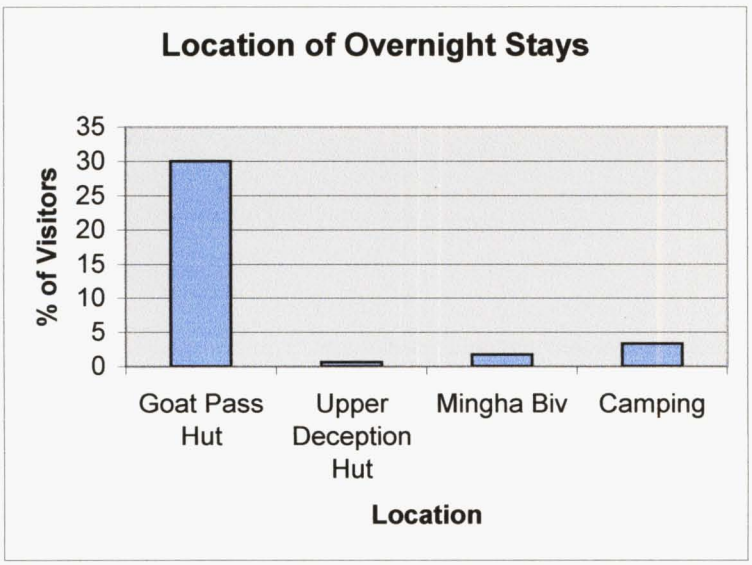

Figure 6.6: Location of overnight stays of participants in the on-site visitor survey (n=64). Several users stayed at more than one location on the Mingha-Deception track during their trip meaning they are represented in more than once in this figure.

The majority of participants (81 percent, n=143) visited the Mingha-Deception track in groups of two to five people. Only one percent (n=2) of participants were in groups of six or more people and 18 percent (31) visited alone. Espiner (1995) also found that a relatively large number (15 percent) of visitors to Arthur's Pass National Park visited alone. Espiner (1995) suggested that this was due to nearly one quarter of overseas visitors travelling alone (compared with 8 percent of New Zealand participants in his study).

Results from the current study, however, suggest that the high number of runners included in the survey affects the overall proportion of participants travelling alone. Of the 31 participants in the on-site visitor survey who travelled alone, 61 percent (n=19) were runners. This made up 20 percent of all runners who participated in the survey. Of the runners who travelled alone, 17 were from New Zealand and two were from overseas. Runners who travelled alone also tended to have prior experience of the Mingha-Deception track as all but two (both from New Zealand) were on their second or subsequent trip to the track. This finding is also illustrated in anecdotal evidence from conversations between the researcher and runners on the track during the survey period. Many runners indicated they had run the Mingha-Deception numerous times and were very familiar with the track. This prior knowledge appears to have contributed to the number of runners who visit the track alone.

When considering the proportion of trampers who travelled alone, the findings reflect the trend for Arthur's Pass National Park visitors as outlined by Espiner (1995). Trampers who travelled alone (n=12) were fairly evenly distributed with five from New Zealand and seven from overseas. However overseas trampers who travelled alone made up 21 percent of all overseas trampers who participated in the survey, while New Zealand trampers who travelled alone made up only 12 percent of all New Zealand trampers represented in the survey. These findings suggest that while the high number of trampers who travel alone largely reflects the high numbers visiting from overseas alone, the results from the on-site visitor survey in the current study are unique to the Mingha-Deception track and can be attributed to the high numbers of runners travelling alone on the track.

6.2.3 Social Impact Conditions

Crowding, conflict and displacement associated with visitor use of the Mingha-Deception track were examined in the on-site visitor survey. Each of these social impacts was occurring to some degree on the Mingha-Deception track during the study period. Results for crowding, conflict and displacement are presented and discussed below.

6.2.3.1 Crowding

Crowding occurs on the Mingha-Deception track, with 17 percent (n=30) of visitors experiencing some degree of crowding at some point during their visit, although less than 10 percent experienced crowding in any one location. Chapter 5 identified that stakeholders who were concerned about crowding thought that the primary place it would occur was Goat Pass hut. Results of the on-site visitor survey show that more participants experience crowding at Goat Pass hut and the Mingha track end than at the Deception track end and on the track and riverbed, although some crowding was reported at these locations (see figure 6.7). Goat Pass hut and the Mingha track end also recorded the highest levels of crowding as they were the only places where people experienced 'moderate crowding' (as opposed to 'slight crowding' in other locations). These results suggest that crowding is more of a problem at these two locations than elsewhere on the track.

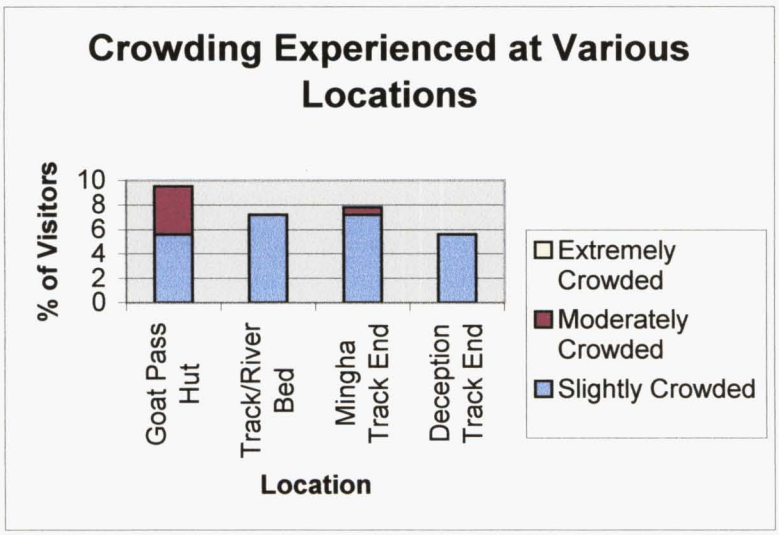

Figure 6.7: Percentage of participants in the on-site visitor survey (n=180) who experienced crowding at various locations. Some participants experienced crowding at more than one location meaning they are represented more than once in this figure.

Goat Pass hut is an obvious location for crowding to occur as people tend to be there all at the same time (overnight). Reasons for crowding at the Mingha track end are not so obvious. Observations made by the researcher provide two suggestions as to why higher levels of crowding occur there. First, the Mingha track end was used by a range of people including visitors using the Mingha and Edwards valleys, people picking up and dropping off track users, overnight campers, and vehicle travellers stopping for short periods (generally up to 30 minutes). Second, even when no other people were at the track end there was nearly always evidence of others such as litter and cars parked in the car park.

6.2.3.2 Conflict

Overall, only six percent (n=11) of participants experienced conflict during their visit to the Mingha-Deception track. Of these, the majority (82 percent, n=9) attributed this conflict to the behaviour of other track users, nine percent (n=1) attributed conflict to the presence of large groups on the track, and nine percent experienced

conflict due to both the behaviour of others and the presence of large groups (see figure 6.8).

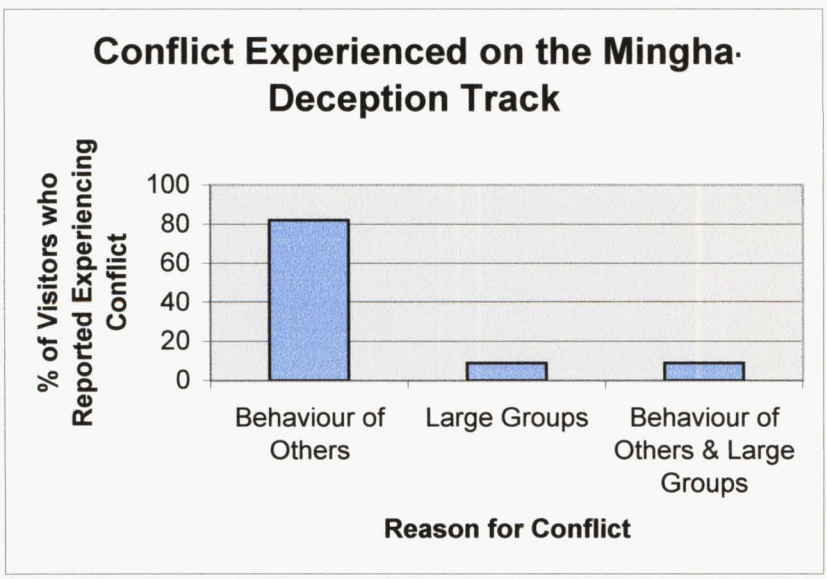

Figure 6.8: Reasons participants in the on-site visitor survey experienced conflict (n=30)

Although conflict between runners and trampers was a significant topic of discussion in the stakeholder interviews, it appears that actual conflict between the two groups is low. Only six percent of participants (7 trampers, 3 runners) reported conflict owing to the behaviour of others during their visit. Participants who experienced conflict due to the behaviour of others were asked to specify the activities of the other users and explain why the behaviour of the other users bothered them. Three participants were bothered by the behaviour of trampers, four by the behaviour of runners and three did not specify an activity type. Participants outlined several reasons why the behaviour of other visitors bothered them. Three visitors were bothered by others openly toileting on the river bed, four were bothered by others dropping rubbish, two were bothered by the noise and alcohol consumption of others in Goat Pass hut and one was bothered due to another user being inadequately prepared for their trip.

These reasons suggest that it is the specific behaviour that causes the conflict rather than the user type. For example, it is likely that rubbish being dropped will be viewed negatively regardless of whether it is dropped by a runner, tramper or other user. That specific actions cause conflict is not surprising given that users have varying perceptions of what is appropriate in outdoor settings (Jacob & Schreyer, 1980) and the actions of some users in natural environments (like dropping rubbish, or alcohol consumption) will be considered inappropriate by some other users. Whether or not different user types are more likely to exhibit certain behaviours than others was not examined in this study and may warrant further research.

The second main concern of stakeholders regarding conflict was that it might be caused by the presence of large groups on the Mingha-Deception track. There is little evidence that this occurs, with only two visitors reporting being bothered by the presence of large groups. Participants in the survey considered a large group to be made up of four to 20 people (mean=8, mode=10). While nearly a quarter (22 percent, n=39) of participants visited the track in groups of four or more, only one percent (n=2) were in groups more than five. This indicates few participants encountered groups they considered to be large during their visit to the track. Conflict owing to the presence of large groups does not appear to be a significant social impact occurring on the Mingha-Deception track.

6.2.3.3 Displacement

Displacement was measured in two categories in the survey; users who had been put off visiting the track in the past due to activities different from their own, and people who may be put off visiting the track in the future for this reason. Only four percent

(n=7) of participants had been displaced in the past, while 20 percent (n=35) suggested they might be displaced in the future. The main reasons participants gave for experiencing displacement were running and hunting on the Mingha-Deception track. Other activities which were reported as causes of displacement included the use of anything motorised on the track and helicopter sightseeing (see figure 6.9).

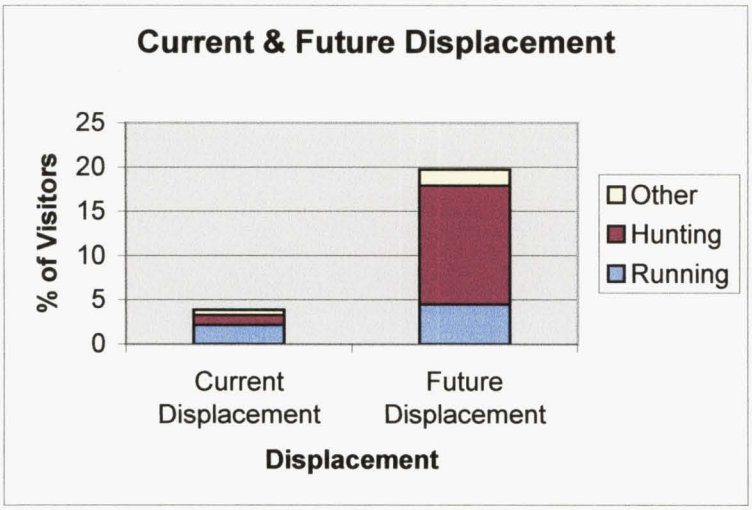

Figure 6.9: Percentage of participants in the on-site visitor survey (n=179) reporting displacement by the activity type causing them to be put of visiting the Mingha-Deception track

Several stakeholders voiced concerns regarding trampers being displaced from the Mingha-Deception track due to the numbers of runners using the track to train for the Coast-to-Coast as well as due to the event itself. Based on the on-site survey results, however, the overall amount of displacement occurring due to runners appears low. Only two percent (n=4) of participants indicated they have been put off visiting the track due to runners in the past and four percent (n=8) suggested they might be put off for this reason in the future.

However, displacement is difficult to measure and some users might already have been displaced from the track during the survey period and therefore are not

represented in the sample. This is likely to contribute to the low levels of reported displacement and conflict because of running training on the track. Visitors who are likely to experience such conflict are likely to have chosen not to do the track during the pre-Coast-to-Coast training period.

Anecdotal evidence from conversations between Park users and the researcher during the survey period suggests that displacement is occurring to some extent. For example, several trampers who visited the Edwards valley during the pre-Coast-to-Coast survey period told the researcher they had specifically chosen not to tramp the Mingha-Deception track during that time owing to the running training occurring on the track. The extent of displacement that has already occurred is unknown. To provide a fuller understanding of displacement occurring on the Mingha-Deception track, surveying would need to take place at times other than the peak use period around the Coast-to-Coast event and also on other tracks in the area during this peak use time.

While displacement due to hunting was not an issue raised by stakeholders, one percent (n=2) of participants had been put off using the track in the past and 13 percent (n=24) of participants suggested they may be put off using the track in the future owing to concerns regarding safety and noise associated with hunting. Only one survey participant was a hunter and nine participants reported seeing hunters during their visit to the track, so it is possible they all saw the same hunter. Due to the low numbers of people using the track for hunting 'visitors being put off using the track due to hunters' is a somewhat hypothetical situation. Displacement due to

hunters on the track is unlikely to occur unless the number of hunters using the track or perceived to be using the track increases significantly.

6.2.4 Visitor Perceptions of Biophysical Impact Conditions

Stakeholders held concerns regarding damage to tracks and vegetation by visitors and the amount of human toilet waste surrounding the track. As this research focuses on social impacts, the actual extent of biophysical impacts occurring on the track and the surrounding area was not measured. Visitor's perceptions of biophysical impacts were measured, however, as they will affect the visitor's overall experience on the track. Results show that a substantial number of visitors noticed biophysical impacts during their visit to the Mingha-Deception track, with over half (53 percent, n=95) reporting track widening, over one quarter (28 percent, n=50) noticing vegetation damage and 12 percent (n=21) noticing human toilet waste (see figure 6.10).

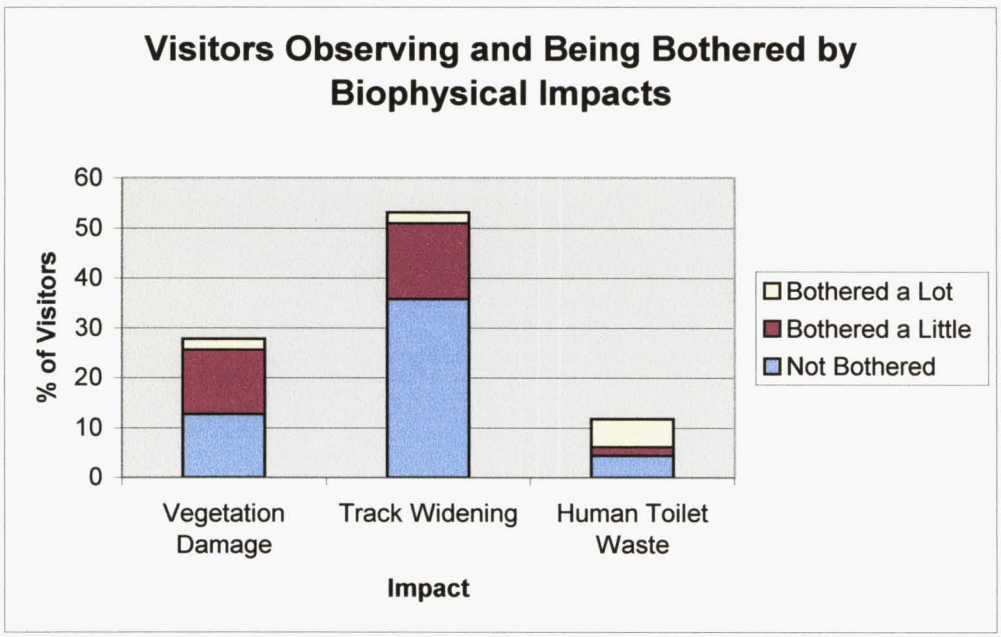

Figure 6.10: Participants in the on-site visitor survey who observed biophysical impacts (vegetation damage and track widening, n=179, human toilet waste, n=178)

Of those who noticed biophysical impacts, one third (33 percent, n=31) were bothered by track widening, 54 percent (n=27) were bothered by vegetation damage and 62 percent (n=13) were bothered by human toilet waste. Participants who were bothered by biophysical impacts were asked if the impact bothered them a little or a lot. Forty eight percent (n=10) of participants who noticed human toilet waste reported that it bothered them a lot, compared with four percent (n=4) and eight percent (n=4) being bothered a lot by track widening and vegetation damage respectively. These figures suggest that while fewer visitors notice human toilet waste on the Mingha-Deception track compared with track widening and vegetation damage, human toilet waste is the biophysical impact that is more likely to bother visitors.

6.2.5 Visitors' Perceptions of Facility Impact Conditions

Stakeholders held a number of concerns regarding the provision and standard of facilities on the Mingha-Deception track and their opinions varied as to whether the extent of facility provision on the track was sufficient, too high or too low. Participant opinions on the provision and consistency of standard of formed tracks and boardwalks, directional signage and huts and bivouacs are outlined in figure 6.11.

A relatively high proportion of participants thought more visitor facilities were needed. One fifth (21 percent, n=38) of participants thought more sections of formed track and boardwalk were needed, while four percent (n=7) thought there were currently too many. More participants (39 percent, n=69) thought that more directional signage was needed on the track, with only three (n= 5) percent indicating there is currently too much. One quarter of participants (26 percent, n=44) thought that more toilets were needed on the track. Few participants (4 percent, n=7) thought

more huts and bivouacs were needed on the track and none considered there to be too many currently (see figure 6.11).

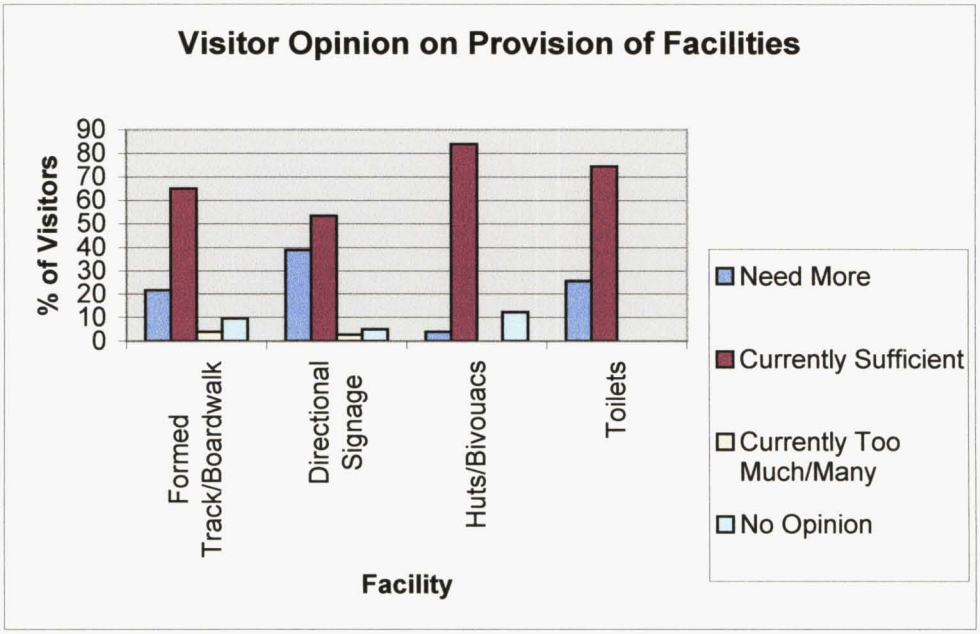

Figure 6.11: Opinion of participants in the on-site visitor survey about the provision of facilities on the Mingha-Deception track (formed track/boardwalk and huts/bivouacs, n=177, directional signage, n=178, toilets, n=172)

Negative comments regarding the standard (quality) of at least one of the facilities on the Mingha-Deception track were made by 29 percent (n=52) of participants. In contrast, 35 percent (n=64) of visitors made positive comments about at least one of the facilities on the track. Figure 6.12 shows the amount of negative and positive comments made about each of the four facilities examined in this research. Positive comments outweigh the negative comments regarding tracks/boardwalks and huts/bivouacs, while there are more negative than positive comments about the standard of directional signage and toilets.

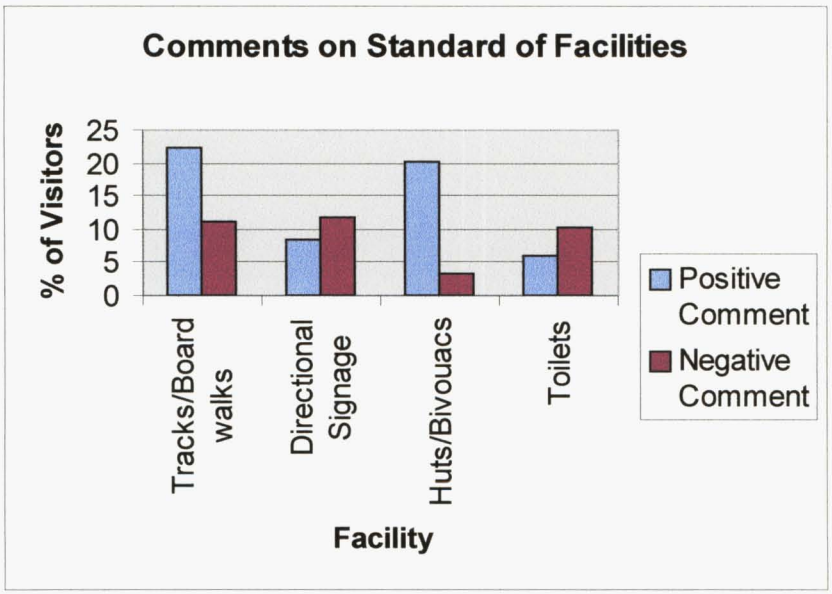

Figure 6.12: Comments of participants in the on-site visitor survey (n=179) regarding the standard of facilities on the Mingha-Deception track.

Conversations between track users and the researcher provided some insight as to why many survey participants reported that more visitor facilities need to be provided on the Mingha-Deception track, or commented negatively regarding the standard of the facilities supplied. These reasons are presented below, however they are speculative and further research would be required to investigate possible relationships.

Although exact numbers were not recorded, informal conversations indicated that a surprising number of people visited the track with little prior knowledge of the track and had not visited a Department of Conservation information centre, read a route description or looked at a map. Lack of preparation by some visitors is further illustrated by the six trampers (in four parties) during the research period who aimed to walk from the Mingha track end to Goat Pass hut and back but accidentally walked to Edwards hut instead. Another person attempted to walk up the track from the Mingha to Deception end but returned to the Mingha track end about two hours after she started because she could not find the route. Lack of preparedness may relate to

the desire for more facilities, particularly directional signage, on the Mingha-Deception track, as people found the track more difficult or the facilities of a lower standard than they expected.

There are several reasons why people might visit the Mingha-Deception track with little prior knowledge of the area and find the track more difficult and less developed than expected. The Mingha-Deception track has received wide publicity owing to the Coast-to-Coast event. Given that people may know Coast-to-Coast participants run the Mingha-Deception track in approximately four to eight hours, it is possible that people visit the track without realising the time it takes to tramp or the level of skill required for the track.

A second related factor is that the Mingha-Deception track appears in some New Zealand guidebooks, and track descriptions are often brief. The reference to the Mingha-Deception (Goat Pass) track in the *New Zealand Lonely Planet* (Smitz, Robinson, Rousseau, & Watkins, 2004), for example, provides a one-paragraph description. It does mention potentially dangerous river crossings and suggests readers visit a Department of Conservation information centre before they visit the track. However, visitors may decide that the description in the guidebook is enough.

Third, some people visit the Mingha-Deception track because of recommendations from others and are guided only by what they have been told. During the research period on the track, two overseas visitors were dropped off at the Mingha track end. They had little knowledge about the track and asked the researcher many questions such as how long they should expect the track to take, and how the track was marked.

When asked by the researcher why they had chosen the Mingha-Deception track, they replied that they had been hitchhiking to Arthur's Pass and the man who gave them a ride told them the Mingha-Deception was a good track, so they asked to be dropped off at the start of it. This is one illustration of visitors on the track with very little prior knowledge of the area.

Finally, the Mingha-Deception is a relatively easy track when compared to other tracks in the Arthur's Pass National Park area. Informal conversations with Department of Conservation staff and other information at the Arthur's Pass Visitor Information Centre suggest users need to have reasonable levels of backcountry skills to visit the Mingha-Deception track. It is possible however, that visitors still underestimate the difficulty of the track, especially if comparing it to easier tracks in other national parks.

6.2.6 Coast-to-Coast Issues

The focus of this research was not specifically on the Coast-to-Coast, however many of the stakeholder discussions revolved around the event, training running before the event and associated impacts. While the role of running in the social impacts experienced on the Mingha-Deception track has been discussed earlier (see section 6.2.3), results of the on-site visitor survey illustrate several other important findings regarding running on the track.

First, it is not always possible to categorise people into specific user groups. Nearly half (48 percent, n=84) of the visitors surveyed were on their first visit to the Mingha-Deception track and 52 percent (n=92) had visited the track at least twice (including

the visit during which they participated in the survey). Nearly half of the participants who had visited the track more than once had carried out a different activity on previous visits (see figure 6.13). An example of a visitor who is considered to have participated in more than one activity is a person who has visited the track once as a runner and once as a tramper.

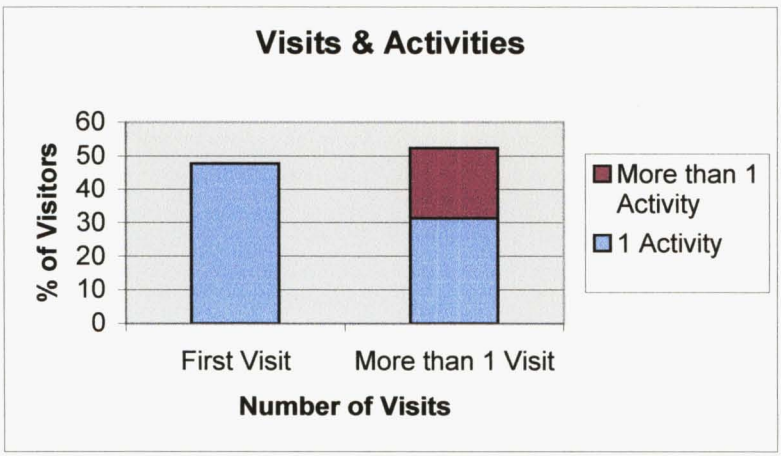

Figure 6.13: Number of visits and main activities undertaken by participants in the on-site visitor survey (n=176)

That many people participate in different activities on different trips to the Mingha-Deception track suggests that many track users are multi-activity recreationists. In her study of mountain-bikers and walkers Horn (1994) also found that many participants (particularly the bikers) also participated in other outdoor recreation activities. These findings suggest that while the activity type a person participates in on a trip will certainly affect the characteristics of that trip, it does not necessarily determine their perceptions of impact in natural areas. That many visitors to the Mingha-Deception track can be considered multi-activity recreationists helps explain the low levels of conflict reported on the track.

That the Coast-to-Coast event occurs on the Mingha-Deception track is well known, and it appears that most of visitors to the Mingha-Deception track are aware of the

event and expect to encounter runners on the track. Encounters with runners on the track were expected by 87 percent (n=155) of participants in the on-site visitor survey. It is evident, however, that not all visitors are aware of running on the Mingha-Deception track, as 13 percent (n=23) of participants did not expect to see this activity.

Many stakeholders discussed the way runners training for the Coast-to-Coast might affect the track and other users, however not all running on the Mingha-Deception track occurs in the period building up to the event. Of the post-Coast-to-Coast survey participants, 32 percent (n=10) were runners. This shows that the track is used for mountain running to some degree outside of the normal pre-event training period. Whether or not this running is associated with the Coast-to-Coast in any way is not known.

6.2.7 Relationships Between User Type and Impacts Experienced

Statistical tests (chi square) were used to test for associations between the main participant activity types (tramping and running) and the experience of the visitor impacts examined in this research. Table 6.1 shows that the only statistically significant association occurred between user type and perception of track widening [$\chi^2(1) = 19.897, p > .001$].

Table 6.1: Results of chi square test for association between the user type of participants and impacts experienced.

Association measured	Value	df	p level**
User type*crowding	5.456	1	.020
User type*conflict (bothered by behaviour of others)	2.809	1	.094
User type*conflict (bothered by large groups)	2.981	1	.084
User type*displacement	.523	1	.470
User type*future displacement	2.491	1	.114
User type*bothered by vegetation damage	1.239	1	.266
User type*bothered by track widening	19.897	1	.000
User type*bothered by human toilet waste	1.581	1	.209
User type*formed track opinion	1.370	3	.713
User type*directional signage opinion	1.439	3	.697
User type*huts/bivouacs opinion	1.349	2	.509
User type*toilets opinion	.054	1	.817
User type*negative comments re facilities	4.230	1	.040

**The alpha level under which the result is considered significant is .004 due to a bonferroni correction for multiple analysis of the same data set (see chapter 4, section 4.4.3).

The significant association between user type and being bothered by track widening was not expected. Figure 6.14 shows that more trampers than runners were bothered by the track widening they observed, with only nine percent (n=9) of runners bothered and 29 percent (n=22) of trampers bothered by track widening. The reasons for this are unknown and further research is required to validate the relationship between user type and being bothered by track widening, and to investigate why it exists.

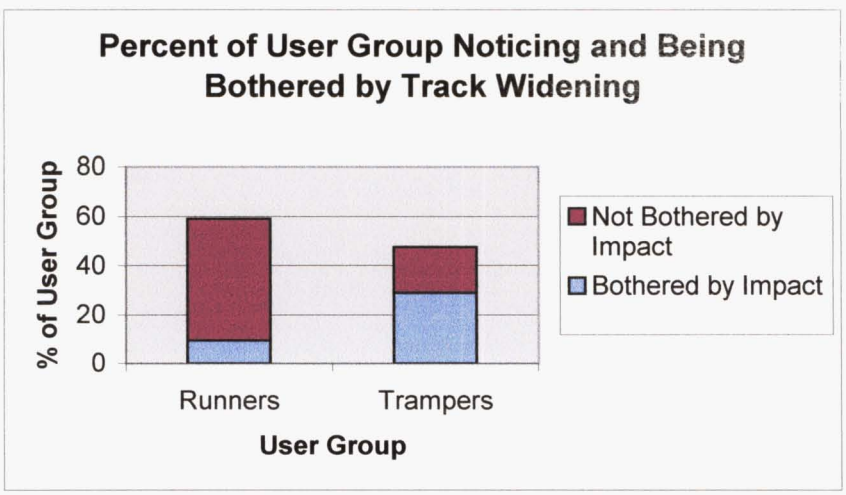

Figure 6.14: Percentage of user group in the on-site visitor survey who noticed track widening, and whether or not they were bothered by it (runners, n=94, trampers, n=76)

The association between user type and crowding is not considered significant in this research due to the application of the bonferroni correction (see chapter 4, section 4.5.3). Further examination of crowding experienced by runners and trampers however, suggests that user type may have some impact on crowding experienced. The on-site visitor survey showed that crowding on the track was experienced by a greater percentage of trampers than runners (see figure 6.15). This can be attributed to the majority of crowding occurring at Goat Pass hut which trampers are more likely to visit during peak use times (such as overnight). Runners, on the other hand, often do not stop at the hut, or else spend short amounts of time there during the day and tend not to stay overnight. Runners are therefore unlikely to experience the same levels of crowding at the hut as trampers.

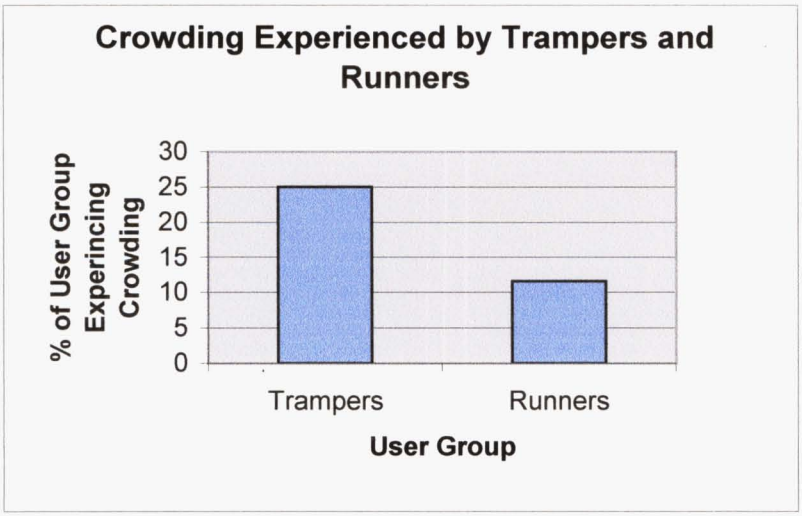

Figure 6.15: Percentage of user group in the on-site visitor survey experiencing crowding (trampers, n=75, runners, n=95)

Results from statistical tests for associations between user type and impact indicate that runners and trampers do not differ significantly in terms of the impacts they experience. Of the 13 impacts tested for associations with user type, 12 were non-significant. This suggests that trampers and runners using the Mingha-Deception

track during the study period may have more similarities than differences (for example, enjoyment of natural environments and physical challenge).

6.2.8 Section Summary

Results for the on-site visitor survey show that all the visitor impacts measured were occurring on the Mingha-Deception track to some degree. The main visitor impacts identified through the issues raised in stakeholder interviews are summarised in table 6.2. The percentage of participants who reported each impact in the on-site visitor survey forms the current impact level, which is also shown in table 6.2.

Table 6.2: Main visitor impacts measured in the on-site survey for the Mingha-Deception track

Visitor Impact	Current Impact Level (%)*
Crowding	17
Conflict	6
Displacement	4
Displacement (including future)	21
Visitors who are bothered by vegetation damage	15
Visitors who are bothered by track widening	17
Visitors who are bothered by human toilet waste	7
Visitors who think more tracks/boardwalks needed	21
Visitors who think more directional signage needed	39
Visitors who think more huts/bivouacs needed	4
Visitors who think there are insufficient toilets	24
Visitors who comment negatively about facilities	28

*Current impact levels have been determined by the percent of participants in the on-site visitor survey who reported the impact.

6.3 SURVEY OF PAST VISITORS

Data from the survey of past visitors was collected from 14 participants who had visited the Mingha-Deception track between 1998 and 2005. Like participants in the on-site visitor survey, the characteristics of those who participated in the survey of past visitors generally reflected the characteristics expected for outdoor recreationists in New Zealand (see Booth & Peebles, 1995). Most participants were male (64

percent, n=9). Half were aged between 20 and 39 years (50 percent, n=7), with 36 percent (n=5) in the 40 to 49 age group. Most were well educated, with 78 percent (n=11) having some sort of tertiary education, and 57 percent (n=8) holding a bachelor's degree or post-graduate qualification. The main occupation type of participants was professional (43 percent, n=6).

The main difference between the characteristics of participants in the survey of past visitors and those who participated in the on-site survey was that all participants in the survey of past visitors were from New Zealand. This can be attributed to the sampling method, as participants in the survey of past visitors were recruited through letters to tramping clubs, newspapers and outdoor publications in New Zealand (see chapter 4, section 4.4.2) so it was unlikely overseas visitors would be included. Seventy nine percent (n=11) of participants were trampers, while 21 percent (n=3) were runners.

The purpose of the survey of past visitors was to compare the visitor impact conditions that occurred on the track in the past with those that occurred in the 2005/2006 summer. Of particular interest was displacement, as it was hypothesised that this method may collect data from displaced users. Figure 6.16 illustrates the percentage of participants in the survey of past visitors who reported each of the main visitor impacts.

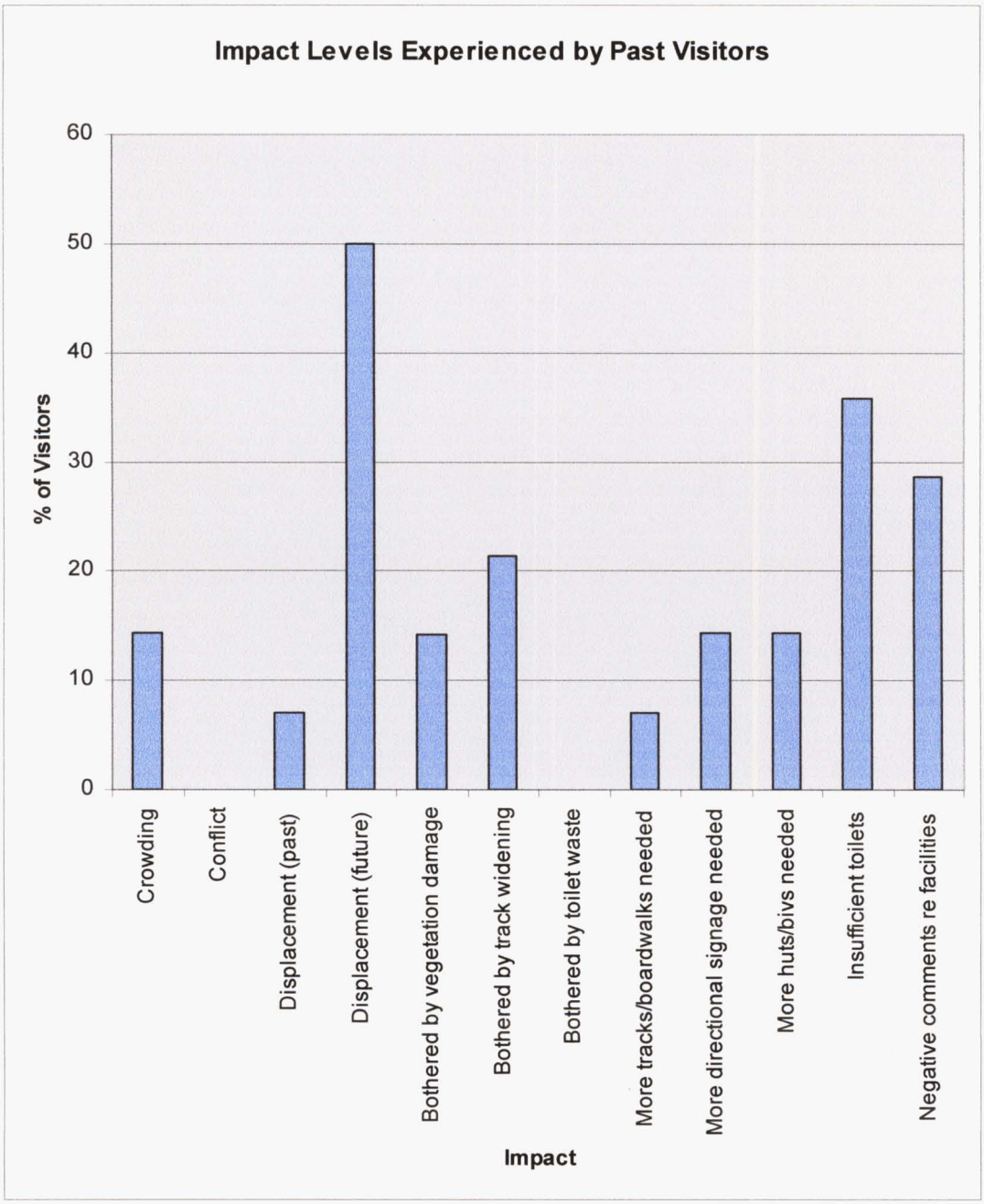

Figure 6.16: Impact levels experienced by participants in the survey of past visitors (n=14)

The impact reported by the highest number of participants in the survey of past visitors was future displacement. Fifty percent (n=7) of participants reported they may be put off using the Mingha-Deception track in the future owing to the presence of people doing activities other than their own on the track. This compares to 20 percent (n=35) of participants in the on-site visitor survey reporting this impact. All participants who reported future displacement in the survey of past visitors indicated

that running on the track was the activity type that may put them off. This differs from those in the on-site visitor survey, the majority of whom reported that hunting was the primary reason they may be put off using the track in the future. These findings support the argument that running on the Mingha-Deception track is causing displacement of visitors. Further research would be required to provide more understanding of the extent of this displacement.

Statistical tests (chi square) were used to test for associations between the time participants visited the Mingha-Deception track (during the 2005/2006 summer, as measured in the on-site visitor survey or in the past 10 years, as measured in the survey of past visitors) and experience of the visitor impacts examined in this research. Table 6.3 outlines the results of chi square tests. The only statistically significant association occurred between time of visit and opinion regarding the provision of huts/bivouacs [χ^2 (3) = 17.546, p = .001].

Table 6.3: Results of chi square test for association between the visit time of participants and impacts experienced.

Association measured	**Value**	**df**	**p level****
Visit time*crowding	.062	1	.804
Visit time*conflict (bothered by behaviour of others)	.825	1	.364
Visit time*conflict (bothered by large groups)	.166	1	.683
Visit time*displacement	.341	1	.559
Visit time*future displacement	7.070	1	.008
Visit time*bothered by vegetation damage	.024	1	.877
Visit time*bothered by track widening	.029	1	.866
Visit time*bothered by human toilet waste***			
Visit time*formed track opinion	9.803	3	.284
Visit time*directional signage opinion	5.641	3	.130
Visit time*huts/bivouacs opinion	17.546	3	.001
Visit time*toilets opinion	1.030	1	.310
Visit time*negative comments re facilities	.001	1	.970

**The alpha level under which the result is considered significant is .004 due to a bonferroni correction for multiple analysis of the same data set (see chapter 4, section 4.4.3).

***Statistical association between visit time and if participants were bothered by human toilet waste could not be measured as no participants in the survey of past visitors had noticed human toilet waste on the Mingha-Deception track, therefore were unable to report whether it bothered them or not.

The association between time of visit and opinion regarding the provision of huts/bivouacs is unexpected. The main differences in opinions between past and present visitors appear to be those who think there are too many huts/bivouacs on the track and those who have no opinion regarding this issue (see figure 6.17). However, the seven percent of visitors in the survey of past visitors who think that more huts/bivouacs are needed (no participants in the on-site survey hold this view) represents only one person due to the small sample size of the survey of past visitors, therefore it cannot be considered an accurate result. Twelve percent of participants (n=22) in the on-site visitor survey held no opinion regarding the provision of huts/bivouacs on the track (compared with none of the participants in the survey of past visitors). This may be a reflection of the large number of runners included in the on-site visitor survey. As many runners do not use the huts/bivouacs on the Mingha-Deception track, they are less likely to hold opinions about them.

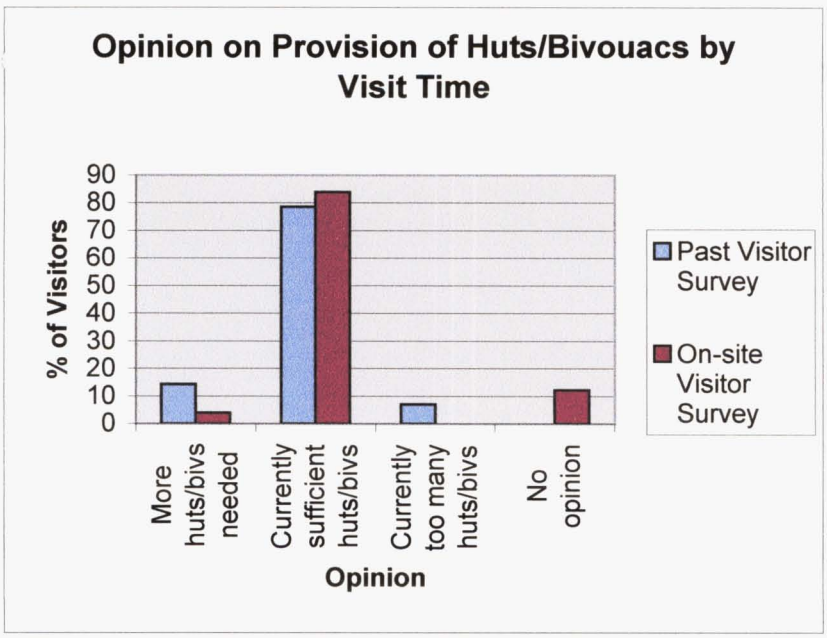

Figure 6.17: Opinion of past visitors (survey of past visitors) and current visitors (on-site visitor survey) regarding the provision of huts/bivouacs on the Mingha-Deception track (past visitor survey, n=14; on-site visitor survey, n=179)

The results presented in this section provide an indication of past visitor conditions on the Mingha-Deception track. Significantly more research, however, would be required to verify the findings presented here.

6.4 CONCLUSION

The aim of this stage of the research was to measure the current social and perceived biophysical visitor impact conditions associated with visitor use on the Mingha-Deception track. This was done via an on-site survey of visitors on the track in the summer of 2005/2006 and a mail-out survey of past visitors to the track. The impact conditions measured were based on the concerns and issues surrounding visitor use of the track raised by stakeholders for the area. They included the effects of runners training for the Coast-to-Coast on other users and more general crowding issues, concerns regarding biophysical damage due to visitor use, and issues surrounding the extent and standard of visitor facilities provided on the track. As the focus of this research is on social issues and visitor perceptions, the biophysical impacts actually occurring on the track were not measured, however visitors' perceptions of these impacts were examined.

The highest impact levels reported by participants in the on-site visitor survey related to the extent and standard of visitor facilities provided. One quarter to one half of visitors appear to be dissatisfied with the amount of directional signage, tracks/boardwalks and toilet facilities provided on the Mingha-Deception track as well as with the quality of these facilities. This suggests that the provision and standard of visitor facilities is an important issue for visitors on the track.

Displacement (including possible future displacement) due to visitors encountering activities other than their own on the track was reported by nearly one quarter of visitors in the on-site survey. Running and hunting were given as the main reasons for displacement. Half of the participants in the survey of past visitors also indicated they had experienced displacement or might do so in the future. These findings suggest that displacement is a significant issue associated with visitor use of the Mingha-Deception track.

Crowding was reported by 17 percent of visitors in the on-site visitor survey, suggesting that crowding has a moderate impact on visitors to the track. Goat Pass hut and the Mingha track end were identified as the main places where crowding was experienced on the track. Vegetation damage and track widening are moderate impacts for visitors on the Mingha-Deception track, with 15 and 17 percent respectively of participants in the on-site visitor survey reporting they were bothered by these impacts.

The lowest impact levels related to conflict, human toilet waste, and the number of huts/bivouacs provided on the Mingha-Deception track. Only six percent of visitors in the on-site visitor survey reported experiencing conflict, seven percent reported being bothered by human toilet waste on or near the track, and four percent thought more huts/bivouacs were needed on the track. This indicates that there is currently little apparent impact on visitors to the Mingha-Deception track from these issues. Despite this, however, the level of conflict and percentage of visitors who are bothered by human toilet waste on the track is significant enough to continue to cause concern to stakeholders, as outlined in the following chapter.

Due to issues raised by stakeholders surrounding the Coast-to-Coast and associated training running that occurs on the Mingha-Deception track, relationships between the user type of participants (runners or trampers) and the impacts they reported were examined. Results indicated that the user type of a participant had little association with the impacts experienced. The only significant association was between user type and being bothered by track widening. The ways in which runners and trampers use the track are different, however, with trampers travelling a variety of routes and spending varying amounts of time on the track. Runners do not stay overnight on the track and mainly travel from the Deception to the Mingha end of the track. The conflict and displacement reported on the track also suggests that while social impact levels owing to the presence of runners on the Mingha-Deception track appear small, they are occurring to some degree.

Chapter 7: Acceptability of Visitor Impact Conditions: Identifying the Limits

7.1 INTRODUCTION

The aim of this stage of the research was to identify levels of acceptability for each of the main visitor impacts identified through stakeholder interviews, and compare those standards with actual impact conditions currently experienced on the Mingha-Deception track, as measured in the visitor surveys. Important to this was the inclusion of stakeholders in setting the acceptability levels. A mail-out survey of stakeholders (for which 66 valid responses were received) was used to measure acceptability levels for impact conditions on the Mingha-Deception track. Stakeholders participating in this survey were asked to rate the acceptability levels of a variety of impact scenarios (see chapter 4, section 4.6). The resulting acceptability levels for visitor impact conditions on the Mingha-Deception track are outlined and discussed in section 7.2. In section 7.3 these acceptability levels are compared with current visitor impact conditions on the track to see whether these current impact levels are acceptable to stakeholders.

7.2 LEVELS OF ACCEPTABILITY

Figure 7.1 illustrates the mean acceptability levels set by the stakeholders for each of the 11 visitor impact conditions. These were identified through stakeholder interviews and measured in the stakeholder survey. These 11 impact conditions are listed below:

- Crowding
- Conflict
- Displacement (past and possible future)
- Visitors who are bothered by vegetation damage
- Visitors who are bothered by track widening
- Visitors who are bothered by human toilet waste
- Visitors who think more tracks/boardwalks are needed
- Visitors who think more directional signage is needed
- Visitors who think more huts/bivouacs are needed
- Visitors who think there are insufficient toilets
- Visitors who comment negatively regarding visitor facilities

For each of the impact conditions listed above, stakeholders were presented with five scenarios outlining a range of impact levels. These scenarios ranged from 10 percent of visitors through to 90 percent of visitors experiencing each impact. Stakeholders rated each impact scenario on a scale of –3 to +3, where –3 to 0 indicated that the impact level was unacceptable, and 0 to +3 indicated an acceptable impact level. The point where the impact trend line crosses the '0' line (as shown in figure 7.1) is therefore the point at which the impact can be considered unacceptable. This point is the acceptability level for each impact condition. Acceptability for each of the impacts declines as a greater percentage of visitors experience the impact.

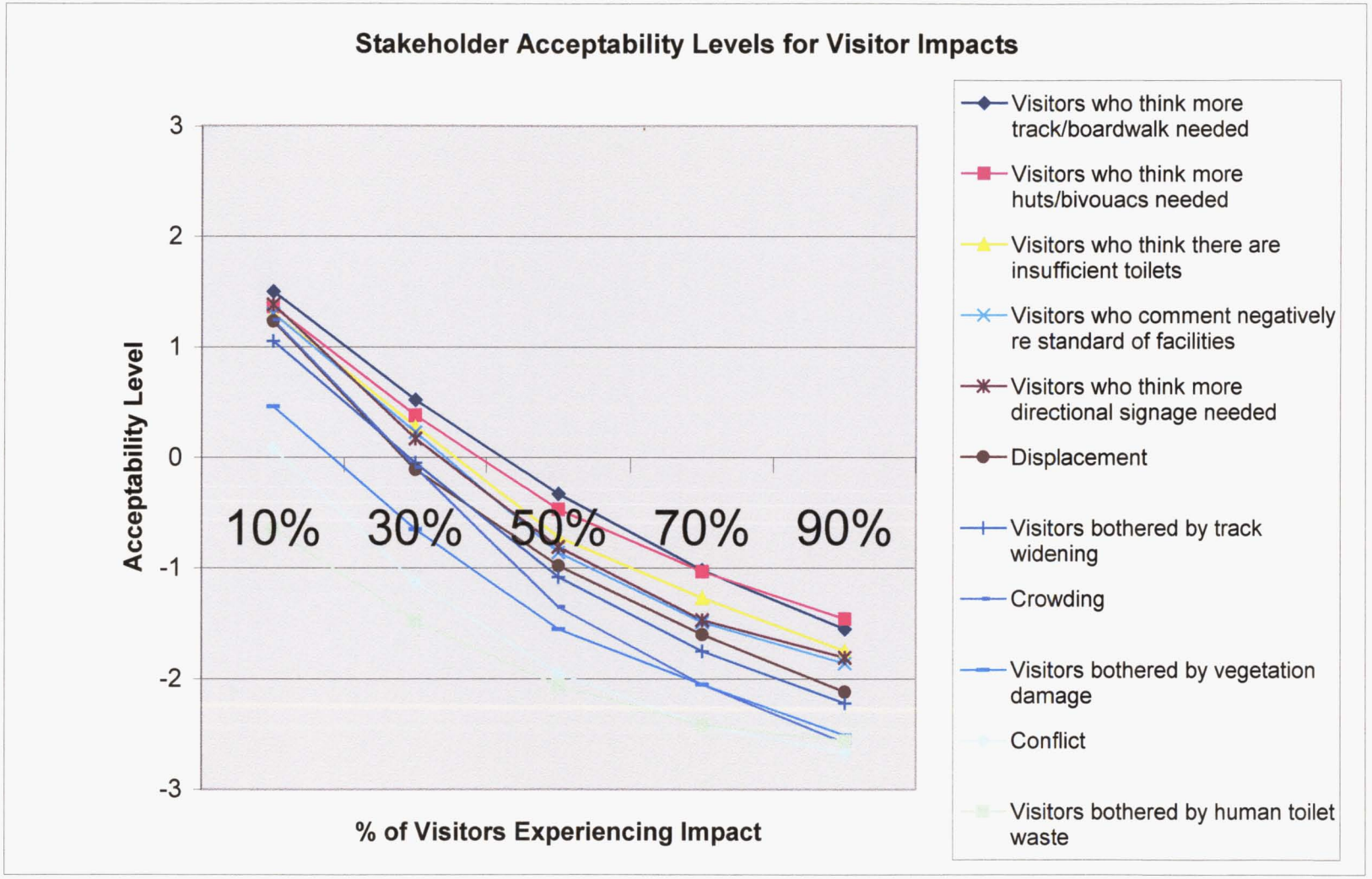

Figure 7.1: Stakeholder acceptability levels for visitor impact conditions on the Mingha-Deception track. The acceptability scale ranges from –3 (very unacceptable) to 3 (very acceptable) with 0 marking the change from acceptable to unacceptable.

The numerical acceptability levels are outlined in table 7.1. Each acceptability level represents the percentage of visitors to the Mingha-Deception track who may experience the corresponding impact before impact levels become unacceptable to stakeholders. For example, up to 29 percent of visitors experiencing crowding on the track is considered acceptable to stakeholders, however if more than 29 percent of visitors experience crowding this is considered an unacceptable impact level.

Table 7.1: Stakeholder Acceptability Levels for Visitor Impacts on the Mingha-Deception Track.

Impact	**Acceptability Level (%)**
Crowding	29
Conflict	11
Displacement	29
Visitors bothered by vegetation damage	18
Visitors bothered by track widening	29
Visitors bothered by human toilet waste	<10*
Visitors who think more tracks/boardwalks are needed	42
Visitors who think more directional signage is needed	34
Visitors who think more huts/bivouacs are needed	39
Visitors who think there are insufficient toilets	36
Visitors who comment negatively regarding facilities	35

*An exact standard cannot be specified for this impact, as acceptability ratings were not measured for impact levels lower than 10%. Stakeholders considered 10% of visitors being bothered by human toilet waste an unacceptable impact level.

Acceptability levels for social and perceived biophysical impacts ranged from less than 10 percent to 29 percent. Visitors being bothered by human toilet waste received the lowest acceptability level (less than 10 percent), suggesting that this is a particularly unacceptable impact to stakeholders. Conflict was also considered by stakeholders to be a serious issue as it was given a low acceptability level of 11 percent. This is not surprising given the importance of this issue to stakeholders who were interviewed (see chapter 5).

Impacts relating to visitor facilities received higher acceptability levels (34 – 42 percent) than both social and perceived biophysical impacts. This indicates that a substantial number of visitors can experience these impacts before they are deemed unacceptable, and suggests that stakeholders do not view visitor perceptions of facilities to be as important as their perceptions of biophysical impacts or experience of social impacts.

7.2.1 Range in Acceptability Ratings for Each Impact Condition

Standard deviations for each impact presented in the stakeholder survey show that individual stakeholder acceptability levels ranged significantly. Table 7.2 shows the standard deviation for each of the visitor impact levels rated by stakeholders. Standard deviations ranged from 0.91 to 1.88.

For social and perceived biophysical impacts, standard deviations tend to range from high, for the lowest impact level presented, to low for the highest impact level presented. This suggests that stakeholder opinions vary less regarding the acceptability of many visitors experiencing social and perceived biophysical impacts than for few visitors experiencing these impacts. The reverse is evident regarding stakeholder opinions of acceptability levels for impacts relating to the extent and standard of visitor facilities. Here the trend indicates that stakeholder opinions vary less regarding the acceptability of few visitors experiencing these impacts related to visitor facilities than for many visitors experiencing these impacts. The reasons for these trends are unknown, and more research would be required to further understand these findings.

Table 7.2: Stakeholder Mean Acceptability Level and Standard Deviation for Each Visitor Impact Scenario

Impact scenarios	% of visitors experiencing impact	Mean acceptability level	Standard deviation
Crowding	10	1.24	1.49
	30	-0.09	1.69
	50	-1.35	1.69
	70	-2.05	1.37
	90	-2.57	0.93
Conflict	10	0.08	1.81
	30	-1.13	1.74
	50	-1.95	1.45
	70	-2.42	1.19
	90	-2.67	0.91
Displacement	10	1.23	1.62
	30	-0.11	1.7
	50	-0.98	1.79
	70	-1.6	1.58
	90	-2.12	1.4
Visitors bothered by vegetation damage	10	0.46	1.81
	30	-0.65	1.77
	50	-1.55	1.47
	70	-2.05	1.15
	90	-2.51	0.97
Visitors bothered by track widening	10	1.05	1.71
	30	-0.05	1.63
	50	-1.08	1.54
	70	-1.75	1.4
	90	-2.22	1.25
Visitors bothered by human toilet waste	10	-0.65	1.69
	30	-1.48	1.69
	50	-2.06	1.54
	70	-2.42	1.4
	90	-2.56	1.33
Visitors who think more tracks/boardwalks are needed	10	1.5	1.58
	30	0.52	1.66
	50	-0.33	1.71
	70	-1.02	1.82
	90	-1.55	1.85
Visitors who think more directional signage is needed	10	1.38	1.51
	30	0.17	1.66
	50	-0.81	1.74
	70	-1.47	1.75
	90	-1.81	1.76
Visitors who think more huts/bivouacs are needed	10	1.36	1.81
	30	0.38	1.8
	50	-0.47	1.78
	70	-1.03	1.76
	90	-1.46	1.82
Visitors who think there are insufficient toilets	10	1.3	1.45
	30	0.28	1.53
	50	-0.72	1.65
	70	-1.27	1.74
	90	-1.75	1.7
Visitors who comment negatively regarding facilities	10	1.3	1.48
	30	0.23	1.5
	50	-0.86	1.65
	70	-1.49	1.76
	90	-1.86	1.88

7.3 ACCEPTABILITY OF CURRENT VISITOR IMPACT CONDITIONS

Current visitor impact conditions for the Mingha-Deception track are compared with impact acceptability levels (as set by stakeholders in the stakeholder survey) in table 7.3. This table shows the current impact levels occurring on the track and the acceptability level for each impact, and indicates whether acceptability levels have been exceeded.

Data from the on-site visitor survey were used to establish current visitor impact levels. The exception to this was displacement, where data from the survey of past visitors have been included to provide an indication of the degree of displacement occurring on the Mingha-Deception track. This is due to the difficulties associated with measuring displacement in on-site surveys (as discussed in section chapter 2 section 2.2.3 and chapter 6 section 6.2.3.3).

Table 7.3: Comparison of Current Impact Conditions with Acceptability Levels Set for the Mingha-Deception Track.

Impact	Current impact level (%)*	Impact acceptability level (%)*	Acceptability level exceeded
Crowding	17	29	No
Conflict	6	11	No
Displacement**	4	29	No
Displacement past and future**	23	29	No
Visitors bothered by vegetation damage	15	18	No
Visitors bothered by track widening	17	29	No
Visitors bothered by human toilet waste	7	<10	Probably
Visitors who think more tracks/boardwalks needed	21	42	No
Visitors who think more directional signage needed	39	34	Yes
Visitors who think more huts/bivs needed	4	39	No
Visitors who think there are insufficient toilets	24	36	No
Visitors who comment negatively regarding facilities	28	35	No

*Impact and acceptability levels relate to the percentage of participants on the Mingha-Deception track experiencing impacts.

**Comparisons have been made with the acceptability level for displacement for both displacement (already occurred) and all displacement (including future). This is due to the somewhat hypothetical nature of future displacement (see chapter 6, section 6.2.3.3) and the large difference in the impact level that is made by including future displacement.

'Visitors who think more directional signage is needed' is the only impact that clearly exceeds the acceptability level set for it. 'Visitors bothered by human toilet waste' is likely to exceed its acceptability level as this impact is currently experienced by seven percent of visitors and the stakeholder acceptability level is somewhere below 10. Conflict and 'visitors bothered by vegetation damage' are within 5 percent of their acceptability levels. Displacement (including future displacement) and visitors who comment negatively regarding facilities are within 10 percent of their acceptability levels. The remainder of the visitor impacts measured are well under the stakeholder acceptability levels set for them.

The LAC planning framework suggests that when acceptability levels are exceeded, managers need to take action to bring impact levels back into the acceptable range. Managers can also heed the warning given by impact levels approaching acceptability levels, and work to keep them from exceeding these levels. The visitor impacts that currently demand the most attention, therefore, are 'visitors who think more directional signage is needed', 'visitors who are bothered by human toilet waste', conflict, 'visitors who are bothered by vegetation damage', displacement (past and possible future) and 'visitors who comment negatively regarding the standard of facilities'. Identifying the most appropriate management action for controlling these visitor impacts which have exceeded or are approaching the levels of acceptability is beyond the scope of this research.

7.4 CONCLUSION

In this stage of the research, stakeholders specified acceptability levels for visitor impact conditions on the Mingha-Deception track. Acceptability levels for different impacts varied, with visitors being bothered by human toilet waste and conflict receiving the lowest acceptability levels and facilities impacts receiving the highest acceptability levels. Comparison of stakeholder acceptability levels with current impact conditions on the track show that the acceptability level for 'visitors who think more directional signage is needed' has been exceeded and that the acceptability level for 'visitors who are bothered by human toilet waste' is likely to have been exceeded. This suggests that managers need to take action to bring these impacts back within the acceptability range. Conflict and 'visitors who are bothered by vegetation damage', displacement (past and future) and 'visitors who comment negatively regarding the standard of facilities' are close to their acceptability levels, suggesting that

management action may need to be taken to ensure they remain within acceptability levels.

Chapter 8: Analysis of the Limits of Acceptable Change Process: A Comparison and Critique of Methods Used

8.1 INTRODUCTION

The purpose of this chapter is to discuss the potential usefulness of the LAC process for managing visitor impacts in New Zealand's natural areas, analyse the success of the three-stage LAC methodology used in the current study, and compare it with methods used in other New Zealand LAC research. This analysis and comparison will discuss the ways in which the LAC process can be implemented successfully in the New Zealand situation to measure the acceptability of visitor impact conditions in natural areas. Section 8.2 outlines the potential of LAC for the management of visitor impacts in New Zealand's natural areas. Discussion of the methods for applying LAC is then presented. The way in which stakeholder values, issues and concerns are identified is discussed in section 8.3, followed by an analysis of the visitor survey method to measure current impact conditions in section 8.4. How to appropriately include stakeholders to set acceptability standards is then examined in section 8.5. The main conclusions from the discussion in this chapter are presented in section 8.6.

8.2 APPROPRIATENESS OF LIMITS OF ACCEPTABLE CHANGE PLANNING IN NEW ZEALAND

Changing patterns of visitor use in New Zealand's protected natural areas have highlighted the need for effective management to ensure visitor impacts in these areas are appropriate and acceptable. Several factors suggest that LAC has the potential to contribute to the effective management of visitor impacts at specific sites in New Zealand. These factors are discussed below.

First, LAC provides a structured framework for the inclusion of public participation in decision-making. Public participation is an important component of natural area management in New Zealand and is required by the National Parks Act 1980 and the Conservation Act 1987. The General Policy for National Parks (Department of Conservation, 2005b) outlines a range of policies on public participation. Policies state for example, that "People and organisations interested in national parks will be consulted when statutory planning documents on national parks are developed, including outcomes sought for places within national parks" (Section 3 (d), General Policy for National Parks 2005) and "People and organisations interested in national parks should be consulted on specific proposals that have significance for them" (Section 3 (e), General Policy for National Parks 2005). These statements illustrate the importance placed upon public participation in the planning process.

As outlined in the literature review (see chapter 2, section 2.4.1) decisions surrounding appropriate visitor use in natural areas involve value judgments. A key component of the LAC process is involving stakeholders in making value judgments about what types and levels of impact from visitor use are acceptable and appropriate. The phased structure of the LAC process should make it clear how stakeholder values and concerns for an area, and their opinion on what levels of impact are acceptable, are incorporated into management decisions. In the three-stage method used in this research, for example, the values, issues and concerns of stakeholders identified in stage one provided the basis for the issues examined in the rest of the study, and impact acceptability levels were set based on the ratings of impact conditions by stakeholders.

The LAC framework also provides a transparent process through which the public can follow the way in which stakeholders have been included and the resulting management steps taken. While this does not suggest that the outcomes of the LAC process will please everybody, its transparency should mean that the management processes are clearly outlined. This may help to dispel any negativity or confusion surrounding the way in which decisions regarding visitor impact management are made.

Second, LAC provides a process for dealing with conflicting values surrounding appropriate visitor use and impacts in protected natural areas. Through the involvement of stakeholders in ascribing values to a site, different perspectives can be taken into account. All natural areas in New Zealand must be managed in accordance with the preservation goals of legislation (such as the National Parks Act 1980 and the Conservation Act 1987), but through the LAC process stakeholders can decide how important each impact and each different type of recreation is at each different site and they can be managed accordingly. The LAC framework will not result in satisfaction for all parties, but it provides a process for reaching a compromise and ensuring all interested parties are involved in the decision-making process.

Third, LAC provides for the monitoring of ongoing change. This is important in New Zealand's natural areas, as change will continue to occur with increasing visitor numbers and changes in recreation patterns and types. Therefore a framework such as LAC that recognises the ongoing nature of change in visitor use and impacts in natural areas is vital to ensure these areas are managed effectively on a long-term basis.

Finally, LAC combines well with the Recreation Opportunity Spectrum (ROS) planning already used by the Department of Conservation. The Recreation Opportunity Spectrum is a planning process that aims to identify and provide a range of recreation opportunities (Corbett, 1995). The ROS system used in New Zealand natural area recreation planning is based on Taylor's (1993) work, which outlined how ROS could be used in the New Zealand situation and describes a range of opportunity classes ranging from urban to wilderness. More recent work by Sutton (2003) described the New Zealand conservation estate in terms of five opportunity classes ranging from shortstop front country through to backcountry wilderness areas. Each of the opportunities identified has different levels of accessibility, expectations for encounters and outdoor skill requirements. While ROS provides a system for identifying and providing for a range of recreation opportunities for people with different needs, it does not deal specifically with the management of visitor impacts. The application of the LAC process would complement ROS planning, as different recreation opportunities could be provided for through ROS, while LAC would provide the tool for managing visitor impacts at specific sites.

The discussion in this section has outlined the reasons LAC has the potential to be useful for visitor impact management in New Zealand's natural areas. The remainder of this chapter focuses on the methods appropriate for applying each of the stages of the LAC process in the New Zealand situation.

8.3 STAGE 1: IDENTIFYING STAKEHOLDER VALUES, ISSUES AND CONCERNS

8.3.1 Identification of Stakeholders

The benefits of including the relevant public in LAC process have been well documented in the literature (Eagles & McCool, 2002; Hendee & Dawson, 2002; Krumpe & McCool, 1997; McCool & Cole, 1997). The appropriate identification of the stakeholders, who need to be included in the LAC process, is also important to ensure the success of the process. It is vital to invite all stakeholder types to participate, as the aim of this stage is to uncover the full range of perspectives on visitor impact issues.

Identifying relevant stakeholders can be a difficult part of the LAC process. In New Zealand LAC-type studies, the stakeholders who should be included in this process have often been chosen according to the interpretation of the researcher. However, previous stakeholder-based research and Department of Conservation literature (see for example Department of Conservation & New Zealand Conservation Authority, 2006) can provide guidelines to the types of groups and individuals who have a stake in natural area management in New Zealand.

The methods used in this research (see chapter 4, section 4.4) were successful in identifying a range of stakeholders to participate in the interview process. A list of possible stakeholders for the Mingha-Deception track was established using as a guideline the type of stakeholders who participated in the research of Johnson et al., (2001), Kazmierow, (1996) and Wray et al., (2005). As the interviews proceeded, the main stakeholders for the Mingha-Deception track were clearly identified as participants discussed other groups or individuals in relation to the track and made

recommendations about who needed to be included in the interview process. While it is difficult to be certain that absolutely every stakeholder group was invited to participate, using this snowballing process of identifying relevant participants means that it is likely that all major stakeholder types were included.

8.3.2 Anonymous Identification of Stakeholder Values, Issues and Concerns

The aim of this stage of the LAC process is to identify the values, issues and concerns held by stakeholders for a natural area, not to assess which stakeholder types hold which views. This is important, as it allows for the anonymous presentation of stakeholder values, issues and concerns for a natural area and avoids the problem of stakeholders being identified and associated with their opinions (see chapter 4, section 4.4.2). Therefore, when presenting the stakeholder values, issues and concerns held for the Mingha-Deception track, as measured in this research, the stakeholder type was not identified. This is not to say that stakeholder type does not affect a person's opinion regarding natural areas, rather that for the purposes of the LAC process the focus is not on the views of various stakeholder types, but on identifying the full range of opinions and perspectives that are held. As noted in section 8.3.1 above, including all relevant stakeholder groups in is important to ensure that the full range of opinions and perspectives are identified.

8.3.3 Strengths and Limitations of Interviewing as a Technique for Identifying Stakeholder Values, Issues and Concerns

Overall, in-depth interviews proved to be a useful tool for identifying the values, issues and concerns of stakeholders for the Mingha-Deception track. The semi-structured nature of the interviews allowed for a relaxed discussion that proceeded as a conversation around several themes. Participants were generally enthusiastic and

interested in the research, and were comfortable sharing their views and opinions with the researcher.

Participation rates in the interview stage of the research were not as high as anticipated however. Of the 14 stakeholders who were invited to participate in this research, only 10 were interviewed. There were two evident reasons for stakeholders not participating in the research. Owing to time constraints in the research timetable, stakeholder interviews had to be conducted during the busy months of November and December, when the summer tourism season is starting, as is the lead up to Christmas. Two stakeholders would have been happy to be interviewed, but could not fit in with the research timetable. Conducting interviews during a more convenient time may have increased participation. The other reason was the researcher's status as a student which affected one stakeholder's willingness to participate. This stakeholder indicated they did not have time to give interviews to students. If the request to participate had come from the Department of Conservation, as the manager of the land, the response may have been different. The lack of participation by several stakeholders in the interview stage of this study can be attributed to limitations specific to this study, rather than problems with using interviews as a method.

The evolving nature of interviewing in this research allowed the researcher to determine when enough information had been gathered. As the number of interviews conducted increased, themes became evident and the number of new issues arising decreased, so that the last stakeholders interviewed largely discussed issues that had already been raised by other stakeholders in the preceding interviews. This suggested

that the major issues had been covered and indicated that enough interviews had been conducted.

8.3.4 Are Interviews the Best Method for Identifying Stakeholder Values, Issues and Concerns?

Interviews are commonly used in LAC research for identifying stakeholder values, issues and concerns for natural areas (see Johnson et al., 2001; Kazmierow, 1996; Needham & Rollins, 2003) but are not the only method available. In a LAC-type study for the Department of Conservation Wray et al., (2005), for example, used a focus group of stakeholders as the method for identifying values, issues and concerns for Mason Bay. Focus groups involve a group of people with certain characteristics (in this case stakeholders for Mason Bay) meeting to discuss an issue (Kreuger & Casey, 1994).

The focus group method may be appealing to managers as it is more economical in terms of time. Focus groups allow for the identification of values, issues and concerns in one meeting, rather than through a series of individual interviews at different times and places. Focus groups, however, require that all stakeholders be identified before the group meets. This means the ongoing identification of stakeholders and evolving information collection used in the interview process is not possible. Wray et al., (2005), however, illustrated that relevant stakeholders types can be identified in advance and subsequently included in a focus group. Therefore both interview and focus group based methods can be successfully used to identify values, issues and concerns for a natural area, providing the stakeholders involved have been carefully selected to ensure representation of all stakeholder types.

8.4 STAGE 2: MEASUREMENT OF CURRENT IMPACT CONDITIONS

The purpose of this stage in the LAC process is to measure the visitor impact conditions at the site being studied. Visitor surveys are an accepted method of measuring social impacts in natural areas and have been used in many LAC-type studies (for examples see Hendee & Dawson, 2002; Johnson et al., 2001; Wray et al., 2005). This study used a survey of on-site visitors, along with a mail-out survey of past visitors, to measure social impacts and visitor perceptions of biophysical visitor impacts occurring on the Mingha-Deception track. The identification of appropriate indicators of impact condition is also important to this stage of the LAC process. The identification of indicators, and the development and implementation of visitor surveys in the LAC process, is discussed below.

8.4.1 Development and Implementation of Visitor Surveys

The content of the visitor survey should not be developed until stakeholder values, issues and concerns have been identified through the first stage of the LAC process. This is because the concerns of stakeholders underpin the issues that need to be measured in the survey. Consideration of stakeholder views will identify the impacts which are of particular concern for an area, and therefore provide guidance as to which impact conditions need to be measured in that area.

In this study an on-site survey of current visitors to the Mingha-Deception track in the 2005/2006 summer and a mail-out survey of past visitors to the track were conducted to measure visitor impact conditions on the track. Often an on-site survey will be sufficient to investigate social visitor impacts in an area, as the purpose of this stage is

to measure the impact levels currently occurring. The main reason to include the survey of past visitors was to provide a greater understanding of the extent of displacement occurring on the track, as this impact is difficult to measure in an on-site survey (see chapter 2, section 2.2.3 and chapter 6, section 6.2.3.3). The issues that need to be investigated in this stage of the research will inform the type of visitor surveys that need to be implemented.

8.4.1.1 Challenges to Backcountry Survey Research

Conducting visitor surveys in the New Zealand backcountry is often challenging (see chapter 4, section 4.5.1.1). However, the way in which visitor surveys are implemented can help overcome these difficulties. In the on-site survey of visitors conducted in this study, several steps were undertaken to ensure the success of data collection methods.

The researcher stationed herself at track ends at times likely to receive the highest use levels (see chapter 4, section 4.5.1), in order to obtain a sufficient sample. Participants were given the option of mailing back the questionnaire (see chapter 4, section 4.5.1) rather than completing it on-site and this was important to the number of responses received. Over half of the participants (52 percent, n=96) returned their questionnaires by mail and a smaller portion (48 percent, n= 88) completed them on-site. Had the mail-back option not been available for track visitors, the number of questionnaires completed would have been significantly lower.

Data collection also took place on selected days over a six-week period which included both weekends and weekdays (see chapter 4, section 4.5.1). This was

important as it meant that people visiting the track at a range of times over the peak summer period were represented. Also, surveying in this study took place both before and after the Coast-to-Coast event. Visitor use of the track changed after the event, with fewer people using the track, and the proportion of visitors undertaking different activities (running and tramping) changed substantially (see chapter 6, section 6.2.2), therefore the impacts they experienced may have been different. It was important to ensure visitors to the Mingha-Deception track both before and after the event were represented.

Surveying visitors in backcountry environments will continue to provide challenges to researchers. Provided appropriate data collection methods are developed for the area being studied, however, visitor surveys will continue to be a useful tool for measuring social impacts in New Zealand's natural areas.

8.4.2 Identification of Indicators

In order to develop tools (such as visitor surveys) to investigate visitor impacts, the indicators through which impact conditions will be measured must be identified. Indicators are measurable variables that provide an indication of the condition of visitor impacts (see chapter 2, table 2.1 and section 2.4.2.2). Concerns were raised as early as 1986 about the appropriate identification of indicators (Prosser, 1986) and this continues to be a relevant issue. Indicators in New Zealand LAC studies tend to be specified by the researchers involved with the project, as was the case in this study.

Indicators which are chosen by researchers may provide valid measurements of impact conditions occurring in an area, however the specification of indicators by

researchers in individual studies does not provide for consistency and comparison between studies. The indicators to be measured must be based on the impact conditions of concern identified by stakeholders in the first stage of the process, and therefore will be specific to the area being studied. However, it is likely that many issues and concerns surrounding visitor use of natural areas in New Zealand will be the same across different sites. For example, social impacts such as crowding, conflict and displacement were all found to be issues of stakeholder concern for both the Mingha-Deception track and Mason Bay (Wray et al., 2005). Concerns regarding biophysical impacts including damage to tracks and vegetation were also found for both the Mingha-Deception track and Mason Bay (Wray et al., 2005), while visitor disturbance of wildlife was an issue at both Mason Bay (Wray et al., 2005) and Waitangiroto Nature Reserve (Kazmierow, 1996). The use of the same indicators to measure these impacts would provide for the comparison between impact conditions occurring at different sites.

If LAC is to be used as a visitor impact management tool in New Zealand, guidelines to measurable, useful indicators of major social and biophysical impact conditions will need to be developed. This will assist researchers and managers to use appropriate indicators for New Zealand conditions and provide for some consistency between indicator measurements in different studies.

8.5 STAGE 3: INDENTIFYING ACCEPTABILITY LEVELS

Identifying acceptability levels for visitor impact conditions is a key stage in the LAC process. This stage is important as it answers the question: how much impact from visitor use is acceptable? Finding the answer to this question defines the desired

conditions for an area and provides the basis for decisions regarding management of visitors. The involvement of the public in setting acceptability levels is vital not only to ensure managers take in the opinions of those for whom natural areas are managed, but also to increase stakeholder acceptance of management decisions made.

While the importance of public participation in the LAC process has been outlined by many (Eagles & McCool, 2002; Hendee & Dawson, 2002; Krumpe & McCool, 1997; McCool & Cole, 1997) there is little material available on the appropriate methods for involving the public in setting acceptability levels in this stage of the LAC process. The current study follows other LAC research in New Zealand in attempting to quantify stakeholder acceptability levels by having stakeholders rate how acceptable they think visitor impact conditions are for certain areas (see chapter 4, section 4.6). This study used a mail-out survey of stakeholders to determine acceptability levels rather than the focus group method used by other New Zealand studies (Kazmierow, 1996; Wray et al., 2005).

8.5.1 Comparison of Methods

The purpose of a mail-out survey rather than a focus group was to try and include more stakeholders in the process and therefore ensure a greater number of views were included in setting acceptability levels. This goal was met, as 66 stakeholders returned completed surveys and were included in setting the acceptability levels for the Mingha-Deception track, compared with the small numbers of stakeholders (5-10) included in this stage of the process in the research of Kazmierow (1996) and Wray et al., (2001). Despite achieving higher stakeholder input than that of focus groups,

however, the mail-out survey process used in this research had several limitations. These are discussed below.

8.5.1.1 Stakeholder Representation

The numbers of representatives of various stakeholder types included in assessing acceptability levels in this research are uneven (see chapter 4, section 4.6.1). Unequal representation of stakeholder type may mean that the acceptability standards specified by participants are skewed towards specific stakeholder groups.

One method for overcoming the problem of uneven stakeholder representation in measuring acceptability levels is to include an equal number of representatives from each stakeholder type in the process. This approach was taken by Wray et al., (2005), where one representative from each of the 10 identified stakeholder groups was selected to be involved in setting acceptability levels. Difficulties could arise, however, as all stakeholders from some stakeholder types (for example concessionaires) are likely to want to be included in the process. Including only one participant from each stakeholder type also assumes that the participant represents the views of the whole group. It is likely that the stakeholder type informs each participant's view to a degree, however not all people in a stakeholder group will hold the same opinion. In the research of Wray et al., (2005), for example, the views of commercial interests in Mason Bay were found to be too diverse to be represented by one stakeholder. Therefore, trying to involve the same number for participants from each stakeholder type will be useful only when a sufficient number of stakeholders from each group are represented.

A second possible method to overcome the problem of uneven stakeholder representation may be through changing the method for calculating acceptability levels. In the current study, and the research of Kazmierow (1996) and Wray et al., (2005), acceptability levels were obtained by calculating the mean of participant acceptability scores for each visitor impact. If stakeholders are unevenly represented, the mean acceptability value of each impact may first be calculated for each stakeholder type. Next, the mean of stakeholder type acceptability values may be calculated, providing the final acceptability level for the visitor impact in question. This calculation method would avoid skewing the results towards the stakeholder types with the highest number of participants in the process.

The above calculation method was unable to be tested in this research as the majority of participants in the stakeholder survey indicated they belonged to more than one stakeholder group. If this method were to be successful, participants would need to be categorised by one stakeholder type only. Further research would be required to verify the success of this method.

8.5.1.2 Stakeholder Understanding of the Process

A further limitation of the mail-out method of including stakeholders to determine acceptability levels is the difficulty of clearly outlining the intent and purpose of the survey. Some recipients of the stakeholder survey in this research found it confusing and difficult to understand (see chapter 4, section 4.6.1). Some participants in the stakeholder focus groups used to set acceptability levels for visitor impacts in Mason Bay (Wray et al., 2005) also found the process of rating the acceptability of visitor impacts confusing. Because a researcher was present at the focus group, however, the

LAC process could be explained and stakeholder questions answered, ensuring participants had a clear understanding of their part in the process (K. Wray, personal communication, 10 August, 2006).

8.5.1.3 Benefits of the Focus Group Method

Focus group type methods are likely to be more appealing to managers than mail-out surveys for several reasons. Having acceptability levels assessed in a meeting situation allows for the two-way communication between managers and stakeholders, ensures that the purpose of the stakeholder survey is understood and helps to dispel any negativity surrounding the LAC process. If stakeholders rate impact acceptability at the same time the final acceptability levels can be calculated immediately, compared with actual impacts occurring and presented back to the stakeholders. Discussion of the results and possible management actions required to manage any impacts that are already exceeding, or are approaching acceptability levels, can begin immediately, giving the meeting a dual purpose.

8.5.1.4 Successful Implementation of the Focus Group Method

The focus group technique compromises the higher levels of stakeholder involvement that can be obtained through a mail-out survey. This could be mitigated to some extent by including more participants in the meeting. A meeting of 20 to 30 participants, for example, could include at least two to three participants from each stakeholder type and increase the range of views represented. Focus groups are generally small to allow for the involvement of all participants in the discussion. In a larger meeting the assessment of acceptability levels could still proceed as an anonymous survey, with stakeholders completing a written questionnaire. Discussion

with other stakeholders would not be required and the size of the group would not matter. Once results had been compiled and compared with actual impacts occurring, the meeting could break into smaller groups for discussion. A stakeholder meeting, therefore, rather than a focus group, would be the method for this stage of the LAC process.

Representation of stakeholder types at the meeting to assess acceptability levels should be as even as possible. While equal representation is ideal, a difference of one or two participants between types is unlikely to significantly affect results. If the difference in the number of representatives between groups is greater, the averaging technique described earlier in this chapter may need to be applied.

8.5.2 Questionnaire Construction

Implementation of the stakeholder survey uncovered an important point relating to the impact scenarios included in the questionnaire. The findings of the stakeholder survey illustrated that some impacts are unacceptable when they are experienced by less than 10 percent of visitors (see visitors being bothered by toilet waste, chapter 7, table 7.1). The lowest impact level scenarios included in the stakeholder survey were 10 percent of visitors experiencing each impact. The measurement of acceptability levels lower than this needs to be provided for in future LAC research.

8.5.3 Section Summary

Using a statistical method of including stakeholders in the third stage of the LAC process is useful, as it provides a way of setting numerical acceptability levels which can then be compared with actual levels of visitor impact. It also provides a process

which clearly shows how impact acceptability levels are determined. There are several difficulties that need to be overcome when implementing this stage of the LAC process. They include encompassing a sufficient number of stakeholders in the process, achieving balanced stakeholder representation, and ensuring stakeholders understand the process. Discussion of the mail-out method used in this study, and the focus group method used in other New Zealand LAC research (Kazmierow, 1996; Wray et al., 2005), suggests that stakeholder meeting-type methodologies which include a survey of a sufficient number of stakeholders may be more beneficial to the LAC process. The key reason for this is that meetings allow for the two-way communication between managers and stakeholders which should minimise any confusion surrounding the survey process.

8.6 CONCLUSION

This chapter has outlined the potential of the LAC process to be useful in managing visitor impacts in New Zealand's natural areas. It has critiqued and compared the methods used in the current study with other methods used in New Zealand LAC research. The purpose of this analysis was to add to the literature regarding the methods appropriate for including the relevant public in the LAC process, and to work towards establishing an appropriate method for applying the LAC process to the management of visitor impacts in New Zealand's natural areas. Based on the discussion presented in this chapter, a three-stage method for including stakeholders in the LAC process to decide what levels of impacts are appropriate in natural areas has been developed and is outlined in table 8.1.

Table 8.1: Overview of the methods for each stage of the LAC process to determine stakeholder acceptability levels for visitor impact conditions.

Stage	Method
1: Identify area values, issues and concerns	Stakeholder interviews or a focus group. The key to this section is ensuring all relevant stakeholder types are represented
2: Measure current impact conditions	Visitor survey. The exact methods used (for example, on-site survey, mail-out) will need to be determined based what is most appropriate for the study site
3: Define levels of acceptability	Stakeholder survey in a group meeting setting. It is important that a sufficient number of stakeholders representing all stakeholder types are included in this stage

The method presented here provides a structured way for managers to include stakeholders in the decision-making process surrounding visitor impacts in natural areas. The development of a set of indicators of social and biophysical visitor impacts appropriate for the New Zealand situation, and further application of LAC in the field will continue to provide improvements to the process.

New Zealand applications of LAC (the current study, Johnson et al., 2001; Kazmierow, 1996; Wray et al., 2005) have illustrated that the first stages of the LAC process are useful for identifying the levels of acceptability of impacts in natural areas, however these studies only include the first half of the LAC process. Full implementation of the LAC would include the involvement of stakeholders in deciding on appropriate management actions regarding visitor impacts in an area, and ongoing monitoring and evaluation of the impacts occurring, and effectiveness of the management strategies implemented. Research to assess the full LAC process will need to be done in conjunction with the Department of Conservation, as independent researchers do not have the authority to implement any actions they recommend in New Zealand's natural areas.

Chapter 9: Conclusion

9.1 INTRODUCTION

This thesis has the dual purpose of analysing the appropriateness of a three-stage LAC method for involving stakeholders in deciding what levels of visitor impact are appropriate and acceptable in New Zealand's natural areas, and examining social impact issues surrounding visitor use of the Mingha-Deception track. The appropriateness of the three-stage LAC method was analysed by applying it to a case study of the Mingha-Deception track and comparing the method used in the current study with methods in other New Zealand LAC studies. Applying the LAC process to the Mingha-Deception track allows for the investigation of issues surrounding visitor use of the track, the measurement of social visitor impacts and the comparison of these with stakeholder acceptability levels for visitor impacts for the track.

In order to draw clear links between the aims and conclusions of this study it is useful to revisit the specific research objectives which were outlined at the beginning of this thesis. The research objectives were:

1) To identify stakeholders for the Mingha-Deception track.
2) To identify and describe stakeholder values, issues and concerns for the Mingha-Deception track.
3) To identify measurable indicators of social and perceived biophysical conditions for the Mingha-Deception track.
4) To measure the status of social and perceived biophysical indicators on the Mingha-Deception track.
5) To assess the stakeholder acceptance of current conditions for the Mingha-Deception track as measured by the indicators.

6) To explore the utility of the methods applied in this research and the Limits of Acceptable Change framework as a visitor impact management tool for New Zealand's natural areas.

Conclusions regarding visitor use of the Mingha-Deception track, which relate to the first five objectives, are outlined in section 9.2. Conclusions which relate to objective six, regarding the LAC process and the methods appropriate for applying it in New Zealand's natural areas, are presented in section 9.3.

9.2 VISITOR USE AND IMPACTS ON THE MINGHA-DECEPTION TRACK

This study looked at social and perceived biophysical impacts on the Mingha-Deception track. Stakeholders were identified and interviewed regarding their values, issues and concerns regarding visitor use of the Mingha-Deception track. Based on the issues and concerns raised in stakeholder interviews, 11 indicators of visitor impact conditions were identified. These indicators were measured, through an on-site survey of visitors to the track during the 2005/2006 summer and a mail-out survey of past visitors to the track, to assess visitor impact conditions for the track. Visitor impact conditions were then compared with stakeholder acceptability levels identified through a survey of stakeholders. Data collection methods and results have been presented and discussed in detail in chapters 4 through 7. The main conclusions from this study relating to issues surrounding visitor use of the Mingha-Deception track are presented in this section.

9.2.1 Stakeholder Values

Stakeholders value the Mingha-Deception track for a variety of reasons relating to the recreation opportunities provided, the biodiversity values of the area and the perceived economic benefits to the neighbouring communities. The track is valued for the tramping opportunities it provides and also as the setting for the Coast-to-Coast multi sport event.

9.2.2 Social Impacts

One of the main issues identified by stakeholders surrounding visitor use of the Mingha-Deception track was conflict between runners and trampers. Stakeholders held varying views on whether or not this was occurring. Survey results suggest that conflict between user groups is not occurring to high levels on the track (six percent of participants in the on-site visitor survey reported experiencing conflict). The behaviour of runners was not the only reason for conflict. Some respondents indicated that they had experienced conflict due the behaviour of trampers. The specific behaviour of the visitors (for example, littering) appeared to be the main cause for the conflict rather than the user activity. Although conflict levels on the Mingha-Deception track were low, the stakeholder acceptability level for conflict was also low and this suggests that current conflict levels are approaching the level beyond which they will no longer be acceptable.

A second major issue relating to the use of the track by runners was displacement. Results from the visitor surveys suggest there is little displacement currently occurring on the track (only four percent of participants indicated they had experienced displacement from the track) and it is far below its acceptability level of

29 percent. Significantly more participants (23 percent), however, indicated they might be displaced from the track sometime in the future. Interestingly, although running on the track was cited by some as the reason for this, many of the participants who indicated they might experience future displacement said hunting was the activity type that would put them off. Total displacement (including future displacement) is within 10 percent of its acceptability level, indicating that it may be an issue of significant concern.

The third social issue examined in this research was crowding. This impact was reported by 17 percent of participants in the on-site visitor survey and was well below its acceptability level of 29 percent. Goat Pass hut and the Mingha track end were identified as the major sites of crowding on the Mingha-Deception track.

9.2.3 Perceptions of Biophysical Impacts

Some stakeholders expressed concerns regarding the biophysical impacts of visitors on the Mingha-Deception track, particularly track widening, vegetation damage and human toilet waste. Visitor's perceptions of these impacts were measured in this research. The acceptability level for 'visitors bothered by human toilet waste' was low (<10 percent). Seven percent of participants in the on-site visitor survey reported this impact, indicating that it is likely to be equal to or exceeding its acceptability level. Track widening and vegetation damage bothered 17 and 15 percent of participants respectively, however both impacts were well below the acceptability levels set for them.

9.2.4 Facilities Impacts

Some stakeholders were concerned about the extent and standard of visitor facilities provided on the Mingha-Deception track. Although the acceptability level for 'visitors who thought more directional signage is needed on the track' was high (34 percent), it was the only impact to clearly exceed its acceptability level with 39 percent of visitors reporting they thought more directional signage was needed on the Mingha-Deception track. The percentage of visitors who commented negatively regarding the standard of facilities on the track was also within 10 percent of its acceptability level.

9.3 APPLICATION OF THE LIMITS OF ACCEPTABLE CHANGE PROCESS IN NEW ZEALAND'S NATURAL AREAS

The LAC process has the potential to be useful in the management of visitor impacts in New Zealand's natural areas as it provides a way of deciding what levels of visitor impact are acceptable. Through a critique and comparison of the LAC methods applied in the current study and those used in other New Zealand LAC-type studies, this thesis has outlined a three-stage method of including stakeholders in the LAC process to identify and measure levels of acceptable impact conditions in New Zealand natural areas. This method has been discussed in detail in chapter 8 and is briefly outlined below.

The first stage of the three-stage process involves outlining the values, issues and concerns held by stakeholders for a natural area through interviews or a focus group. Key to this stage is ensuring all relevant stakeholders are identified and included. The second stage requires the measurement of current impact levels for the area. This can

be done via a survey of visitors for social impacts and visitor perceptions. Appropriate ways for measuring biophysical impacts were not examined in this research. The third stage of the process involves a stakeholder meeting at which stakeholders set acceptability levels for visitor impact conditions by way of a confidential stakeholder survey completed at the meeting. The acceptability of current impact levels can then be determined by comparing them with stakeholder acceptability levels. It is important that all relevant stakeholder groups are adequately and equally represented in this stage of the process.

The key benefit of this method is that it provides a structured process for making decisions based on the views and beliefs of stakeholders. This is important as it provides managers with a clear way of showing how they have arrived at decisions, therefore making these decisions defensible to the public. The involvement of stakeholders through interviews and focus groups will foster dialogue among stakeholders themselves and between stakeholders and managers. This will add to the understanding of different perceptions regarding issues for the natural area and allow managers to answer any questions stakeholders have regarding the LAC process.

9.4 FUTURE RESEARCH NEEDS

This case study which applied the LAC process to the Mingha-Deception track has outlined the social and perceived biophysical impacts occurring on the track and identified stakeholder acceptability levels for these impacts. Some impacts are currently approaching or exceeding acceptability levels, indicating that management action should be taken to keep them within acceptable levels. Further research and

discussion will be needed to decide on the most appropriate strategies to manage these impacts. Stakeholders should be included in this process.

The current study measured visitor perceptions of biophysical impacts. Actual biophysical impacts occurring on the Mingha-Deception track also need to be examined. Applying the LAC process to biophysical impacts occurring through visitor use of the track would allow for the measurement of the impacts and define the desired conditions by stakeholders setting acceptability levels.

The usefulness of the LAC process as a management tool for New Zealand's natural areas would be improved by further research regarding the appropriate indicators for measuring visitor impact conditions in this country. The development of a set of indicators of common visitor impacts (for example, crowding, conflict, displacement, track widening and vegetation damage) would assist researchers and managers in choosing indicators that are appropriate for the impacts they wish to measure.

The current study and other New Zealand research has focused on the first stages of the LAC process. Further research is needed to assess the suitability of the full LAC process to visitor impact management in New Zealand. Such research will necessarily involve the Department of Conservation because it is the manager of New Zealand's protected natural areas.

9.5 FINAL WORD

The result of this thesis is two-fold. First, it provides useful information surrounding visitor use issues for the Mingha-Deception track and benchmark data regarding the levels of impact currently occurring on the track. Second, discussion of the methods used in this study and other New Zealand LAC-type studies has resulted in the development of a three-stage method appropriate for applying the LAC process in New Zealand's natural areas. This method provides a structured way of including stakeholders in decision-making surrounding the acceptability of visitor impacts at specific sites.

References

Abdi, H. (2007). The bonferroni and sidak corrections for multiple comparisons. In N. J. Salkind (Ed.) *Encyclopaedia of Measurement and Statistics.* Thousand Oaks: Sage. www.utdallas.edu/~herve/Abdi-Bonferroni2007-pretty.pdf (accessed 25/08/06).

Alldredge, R. B. (1973). Some capacity theory for parks and recreation areas. *Trends, 10.* (4). 20-30.

Ahn, B. Y., Lee, B., & Shafer, C. S. (2002). Operationalizing sustainability in regional tourism planning: An application of the limits of acceptable change framework. *Tourism Management*, 23. 1-15.

Babbie, E. (2004). *The practice of social research (10th Ed.)*. Belmont: Wadsworth.

Baily, M., Blaschke, P., Gough, J., Pihema, W., Taylor, N., & Warren, J. (2003). *Integrated planning and management of tourism and related activities in natural areas: A review of tools and approaches*. Foundation for Research, Science and Technology. http://www.tba.co.nz/frst_projects/SYNTHESIS_REPORT_(tools_&_approaches).pdf (accessed 22/08/05).

Blahna, D. J., Smith, K. S., & Anderson, J. A. (1995). Backcountry llama packing: Visitor perceptions of acceptability and conflict. *Leisure Sciences, 17.* (3). 185-204.

Booth, K. (2006). Review of visitor research for the Department of Conservation, *Department of Conservation Research and Development Series, 229.* Wellington: Department of Conservation.

Booth, K., & Peebles, C. (1995). Patterns of use. In P. J. Devlin, R. Corbett & C. J. Peebles (pp. 99-136). *Outdoor recreation in New Zealand, Vol 1.* Wellington: Department of Conservation and Lincoln University.

Bury, R. L., Holland, S. M., & McEwan, D. N. (1983). Analyzing recreational conflict. *Journal of Soil and Water Conservation, 38.* (5). 401-403.

Cessford, G.R. (1997a). Visitor satisfactions, impact perceptions and attitudes toward management options on the Tongariro Circuit Track. *Science for Conservation, 65.* Wellington: Department of Conservation.

Cessford, G.R. (1997b). Visitor satisfactions, impact perceptions, and attitudes toward management options on the Kepler Track. *Science for Conservation, 70.* Wellington: Department of Conservation.

Cessford, G.R. (1997c). Visitor satisfactions, impact perceptions and attitudes toward management options on the Lake Waikaremoana Track. *Science for Conservation, 73.* Wellington: Department of Conservation.

Cessford, G.R. (1997d). Visitor satisfactions, impact perceptions and attitudes toward management options on the Rakiura Track. *Science for Conservation, 80.* Wellington: Department of Conservation.

Cessford, G.R. (1997e). Visitor satisfactions, impact perceptions and attitudes toward management options on the Heaphy Track. *Science for Conservation, 82.* Wellington: Department of Conservation.

Cessford, G.R. (1997f). Visitor satisfactions, impact perceptions and attitudes toward management options on the Milford Track. *Science for Conservation, 87.* Wellington: Department of Conservation.

Cessford, G.R. (1997g). Canoeist satisfactions, impact perceptions and attitudes toward management options on the Whanganui Journey. *Science for Conservation, 90.* Wellington: Department of Conservation.

Cessford, G.R. (1998a). Visitor satisfactions, impact perceptions and attitudes toward management options on the Abel Tasman Coastal Track. *Science for Conservation, 76.* Wellington: Department of Conservation.

Cessford, G.R. (1998b). Sea-kayaker satisfactions, impact perceptions and attitudes toward management options in Abel Tasman National Park. *Science for Conservation, 79.* Wellington: Department of Conservation.

Cessford, G.R. (1998c). Visitor satisfactions, impact perceptions and attitudes toward management options on the Travers-Sabine Circuit Track. *Science for Conservation, 91.* Wellington: Department of Conservation.

Cessford, G.R. (1998d). Visitor satisfactions, impact perceptions and attitudes toward management options on the Routeburn Track. *Science for Conservation, 92.* Wellington: Department of Conservation.

Clark, R. N., Hendee, J. C., & Campbell, F. L. (1971). Values, behaviour and conflict in modern camping culture. *Journal of Leisure Research, 3.* 143-159.

Coast to Coast. (2001, January 31). *The Press*, p. 6.

Cole, D. N., & McCool, S. F. (1997). Limits of Acceptable Change and natural resources planning: When is LAC useful, when is it not?. In S. F. McCool & D. N. Cole, (compilers). Proceedings – Limits of Acceptable Change and related planning processes: Progress and future directions, Missoula, May 1997. *Intermontane Research Station General Technical Report 371*, USDA Forest Service.

Cole, D. N., & Stewart, W. P. (2002). Variability of user-based evaluative standards for backcountry encounters. *Leisure Sciences, 24.* 313-324.

Corbett, R. (1995). Managing outdoor recreation. In P. J. Devlin, R. Corbett & C. J. Peebles (pp.197-214). *Outdoor recreation in New Zealand, Vol. 1.* Wellington: Department of Conservation and Lincoln University.

Corbett, R. (2001). Social impact issues among visitors to Franz Josef Glacier, Westland National Park. *Science and Research Internal Report, 186.* Wellington: Department of Conservation.

Coughlan, D. P., & Kearsley, G. W. (1996). Does participation affect perceptions of crowding? The case of the New Zealand backcountry. In *Tourism Down-Under II: A Tourism Research Conference 3-6 December 1996*, University of Otago. Pp. 36-42.

Curbs on runners. (2000, July 14). *The Press*, p. 10.

Department of Conservation (1996). *Visitor Strategy.* Wellington: Department of Conservation.

Department of Conservation (2003). *Arthur's Pass National Park: Route guide series no. 6, Mingha River – Goat Pass – Deception River*, [Brochure]. Christchurch. Department of Conservation.

Department of Conservation. (2005a). www.doc.govt.nz. (accessed 12/08/05).

Department of Conservation (2005b). *General Policy for National Parks.* Wellington: Department of Conservation.

Department of Conservation (2006). *Arthur's Pass National Park Management Plan Draft.* Christchurch: Department of Conservation.

Department of Conservation & New Zealand Conservation Authority. (2006). *Department of Conservation's statutory planning processes: What they mean for you and how you can have your say.* Wellington: New Zealand Conservation Authority.

Devall, B., & Harry, J. (1981). Who hates whom in the great outdoors: The impact of recreation specialization and technologies of play. *Leisure Sciences, 4.* (4). 399-418.

Ditton, R. B., Felder, A. J., & Graefe, A. R. (1983). Factors contributing to perceptions of recreational crowding. *Leisure Sciences, 5.* (4). 273-288.

Dulkul, P. (2001). *Crowding norms in Thai national parks: A case study of Nam Tok Phrew National Park, Thailand.* Unpublished Master's Thesis, Lincoln University, Canterbury, New Zealand.

Eagles, P. F. J., & McCool, S. F. (2002). *Tourism in national parks and protected areas: Planning and management.* Wallingford: CABI.

Espiner, S. R. (1995). *Social dimensions of national park use: A case study of summertime visitation to Arthur's Pass National Park.* Unpublished Master's Thesis, Lincoln University, Canterbury, New Zealand.

Espiner, S. R., & Simmons, D. G. (1998). A national park revisited: Assessing change in recreational use of Arthur's Pass National Park. *New Zealand Geographer, 54.* (1). 37-45.

Federated Mountain Clubs (2005). www.fmc.org.nz (accessed 15/12/05)

Festinger, L. (1957). *The theory of cognitive dissonance.* Stanford: Stanford University Press.

Hammitt, W., & Cole, D. (1998). *Wildland recreation: Ecology and Management (2nd Ed.).* New York: John Wiley.

Hansford, D. (2002). At the end of the long white cloud. *New Zealand Wilderness,* May 2002. 30-35.

Hawke, N. D. (2000). *Problems in paradise?: Conflict between sea-kayakers and motorised watercraft users along the Abel Tasman National Park coastline.* Unpublished Master's Thesis, Lincoln University, Canterbury, New Zealand.

Hawke, N., & Booth, K. (2001). Conflict between sea-kayakers and motorised watercraft users along the Abel Tasman National Park coastline, New Zealand. *Tourism Recreation Research and Education Centre (TRREC) Report, No. 2001/50.* Lincoln University.

Hendee, J. C., & Dawson, C. P. (2002). *Wilderness management: Stewardship and protection of resources and values, (3rd Ed.).* Colorado: Fulcrum Publishing.

Higham, E. C., Kearsley, G. W., & Thyne, M. (1996). Crowding and encounter norms in New Zealand's conservation estate. In *Tourism Down-Under II: A Tourism Research Conference 3-6 December 1996.* University of Otago. Pp. 120-131.

Horn, C. (1994). *Conflict in recreation: The case of mountain-bikers and trampers.* Unpublished Master's Thesis, Lincoln University, Canterbury, New Zealand.

Jacob, G. R., & Schreyer, R. (1980). Conflict in outdoor recreation: A theoretical perspective. *Journal of Leisure Research, 12.* (4). 368-380.

Johnson, V., Ward, J., & Hughey, K. (2001). Issues and indicators of acceptable change: A study of visitors' and stakeholders' concerns about three natural attractions in the Paparoa area, West Coast, South Island, New Zealand. *Tourism Recreation Research and Education Centre Report No. 40/2001,* Lincoln University.

Judkins, R., & Norton, D. (1994). *Application for a consent to run the Coast to Coast event through the Arthur's Pass National Park.* Christchurch: Ironman Productions.

Kazmierow, B. J. (1996). *Ecological and human dimensions of tourism-related wildlife disturbance at the Waitangiroto White Heron (Kotuku) colony, South Westland, New Zealand.* Unpublished Master's Thesis, Lincoln University, Canterbury, New Zealand.

Kearsley, G. W. (1997). Perceptions of social and physical impacts upon New Zealand's back country environments. In M. Upperman (Pp. 156-166). *Pacific Rim Tourism.* Wallingford: CABI.

Kearsley, G. W., Russell, S., Croy, W. G., & Mitchell, R. D. (2001). Recreational and tourist use of New Zealand's accessible natural areas: Activities, Motivations and Social Impacts. *Research Paper No. 9..* Centre for Tourism, University of Otago.

Kreuger, R. A., & Casey, A. (1994). *Focus groups: A practical guide for applied research (2nd Ed.).* London: Sage.

Krumpe, E., & McCool, S. F. (1997). Role of public involvement in the limits of acceptable change wilderness planning system. In S. McCool & D. Cole, (compilers). Proceedings – Limits of Acceptable Change and related planning processes: Progress and future directions, Missoula, May 1997. *Intermontane Research Station General Technical Report 371*, USDA Forest Service.

Kuss, F. R., Graefe, A. R., & Vaske, J. J. (1990a). *Visitor impact management: A review of research.* Washington DC: National Park and Conservation Association.

Kuss, F. R., Graefe, A. R., & Vaske, J. J. (1990b). *Visitor impact management: The planning framework.* Washington DC: National Park and Conservation Association.

Laven, D. N., Manning, R. E., & Krymkowski, D. H. (2005). The relationship between visitor-based standards of quality and existing conditions in parks and outdoor recreation. *Leisure Sciences, 27.* 157-173.

Lofland, J., & Lofland, L. H. (1995). *Analyzing social settings: A guide to qualitative observation and analysis (3rd Ed.).* Belmont: Wadsworth.

McAvoy, L. H., Gramann, J. H., Burdge, R. J., & Absher, J. D. (1986). Understanding the causes of conflict between commercial and recreational users of the Mississippi River. *Journal of Park and Recreation Administration, 4.* 49-60.

McCool, S. F., & Cole, D.N. (1997). Experiencing Limits of Acceptable Change: Some thoughts after a decade of implementation. S.F. McCool & D. N. Cole, (compilers). Proceedings – Limits of Acceptable Change and related planning processes: Progress and future directions, Missoula, May 1997. *Intermontane Research Station General Technical Report 371*, USDA Forest Service.

Manning, R. E. (1999). *Studies in outdoor recreation: Search and research for satisfaction (2nd Ed.).* Corvallis: Oregon State University Press.

Manning, R. E. (2003). What to do about crowding and solitude in parks and wilderness? A reply to Stewart and Cole. *Journal of Leisure Research, 35.* (1). 107-118.

Manning, R. E., Lime, D. W., & Hof, M. (1996). Social carrying capacity of natural areas: Theory and application in the U.S. National Parks. *Natural Areas Journal, 16.* 118-127.

Manning, R. E, & Valliere, W. A. (2001). Coping in outdoor recreation: Causes and consequences of crowding and conflict among community residents. *Journal of Leisure Research, 33.* (4). 410-426.

Ministry of Tourism (2003). *Towards 2010: Implementing the New Zealand tourism strategy.* Wellington: Ministry of Tourism.

Ministry of Tourism (2006). *International Visitor Survey.* www.tourismresearch.govt.nz/Datasets/International+Visitor+Survey/Data+Analysis/default.htm (accessed 15/09/06).

Needham, M. D., & Rollins, R. B. (2005). Interest group standards for recreation and tourism impacts at ski areas in the summer. *Tourism Management, 26.* 1-13.

Nilsen, P., & Tayler, G. (1997). A comparative analysis of protected area planning and management frameworks. S. McCool & D. Cole, (compilers). Proceedings – Limits of Acceptable Change and related planning processes: Progress and future directions, Missoula, May 1997. *Intermontane Research Station General Technical Report 371,* USDA Forest Service.

Norton, D. A. (1989). *Environmental impact report on the Mingha/Deception section of the Coast to Coast endurance event.* Report prepared for Coast-to-Coast Ltd.

Norton, D. A. (1995). *Speight's Coast to Coast, Deception-Mingha mountain running section: Annual monitoring report, 1995 report.* Report prepared for Coast-to-Coast Ltd.

Norton, D. A. (1996). *Speight's Coast to Coast Deception-Mingha mountain running section: Annual monitoring report, 1996 report.* Report prepared for Coast-to-Coast Ltd.

Norton, D. A. (1997). *Speight's Coast to Coast, Deception-Mingha mountain running section: Annual monitoring report, 1997 report.* Report prepared for Coast-to-Coast Ltd.

Norton, D. A., & Stilwell, J. M. (1998). *Speight's Coast to Coast, Deception-Mingha mountain running section: Annual monitoring report, 1998 report.* Report prepared for Coast-to-Coast Ltd.

Norton, D. A., & Stilwell, J. M. (1999). *Speight's Coast to Coast Deception-Mingha mountain running section 1999: Annual monitoring programme report and 1995-1999 summary report.* Report prepared for Coast-to-Coast Ltd.

Norton, D. A., & Stilwell, J. M. (2000). *Speight's Coast to Coast, Deception-Mingha mountain running section: 2000 annual monitoring programme report.* Report prepared for Coast-to-Coast Ltd.

Norton, D. A., & Stilwell, J. M. (2001). *Speight's Coast to Coast, Deception-Mingha mountain running section: 2001 annual monitoring programme report.* Report prepared for Coast-to-Coast Ltd.

Norton, D. A., & Stilwell, J. M. (2002). *Speight's Coast to Coast, Deception-Mingha mountain running section: 2002 annual monitoring programme report.* Report prepared for Coast-to-Coast Ltd.

Norton, D. A., & Stilwell, J. M. (2003). *Speight's Coast to Coast, Deception-Mingha mountain running section: 2003 annual monitoring programme report.* Report prepared for Coast-to-Coast Ltd.

Norton, D. A., & Stilwell, J. M. (2004). *Speight's Coast to Coast Deception-Mingha mountain running section: 2004 annual monitoring programme report and 2001-2004 summary report.* Report prepared for Coast-to-Coast Ltd.

Norton, D. A., & Stilwell, J. M. (2005). *Speight's Coast to Coast, Deception-Mingha mountain running section: 2005 annual monitoring programme report.* Report prepared for Coast-to-Coast Ltd.

Palmer, J.D. (1979). *The Goat Pass track: A study of park management within a limited area of the Arthur's Pass National Park, and the conflict between the 'preservation' and 'public access' objectives of the National Parks Act 1952.* Unpublished Diploma Thesis, Lincoln College, Canterbury, New Zealand.

Palmerston North Tramping and Mountaineering Club (2006). www.pntmc.org.nz/photos/Lewis_Arthurs/ThumbnailFrame.html (accessed 24/08/06).

Prosser, P. (1986). The limits of acceptable change: An introduction to a framework for natural area planning. *Australian Parks and Recreation, 22.* (2). 5-10.

Ramthun, R. (1995). Factors in user group conflict between hikers and mountain bikers. *Leisure Sciences, 17.* (3). 159-169.

Schreyer, R. (1990). Conflict in outdoor recreation: The scope of the challenge to resource planning and management. In J. Vining (Ed.). (Pp. 13-31). *Social science and natural resource recreation management.* Boulder: Westview Press.

Sharpe, A. G. (1999). *Displacement of New Zealand trampers from the Great Walks track network, New Zealand.* Unpublished Master's Dissertation, Lincoln University, Canterbury, New Zealand.

Shelby, B., & Heberlein, T.A. (1986). *Carrying capacity in recreation settings.* Corvallis: Oregon State University Press.

Shindler, B., & Shelby, B. (1995). Product shift in recreation settings: Findings and implications from panel research. *Leisure Sciences, 17.* (2). 91-107.

Smitz, P., Robinson, M., Rousseau, N., & Watkins, R. (2004). *New Zealand.* Footscray: Lonely Planet.

Stankey, G. H. (1989). Solitude for the multitudes: Managing recreational use in the wilderness. In I. Altman & E. H. Zube (Eds.). (Pp. 277-299). *Public places and spaces: Human behaviour and environment, advances in theory and research (Vol. 10).* New York; Plenum Press.

Stankey, G. H. (1997). Institutional barriers and opportunities in application of the limits of acceptable change. In S. McCool & D. Cole, (compilers). Proceedings – Limits of Acceptable Change and related planning processes: Progress and future directions, Missoula, May 1997. *Intermontane Research Station General Technical Report 371*, USDA Forest Service.

Stankey, G. H., Cole, D. N., Lucas, R. C., Petersen, M. E., & Frissell, S. S. (1985). The limits of acceptable change (LAC) system for wilderness planning. *General Technical Report, Intermountain Forest and Range Experiment Station No. 176*, Ogden, Utah.

Stewart, W. P., & Cole, D. N. (2003). On the prescriptive utility of visitor survey research: A rejoinder to Manning. *Journal of Leisure Research, 35.* (1). 119-127.

Sutton, S. (2003). *Recreation opportunity spectrum mapping.* Unpublished Department of Conservation internal paper (STSO SRO).

Sutton, S. (2004). Outdoor recreation planning frameworks: An overview of best practices and comparison with Department of Conservation (New Zealand) planning processes. In K. A. Smith & C. Schott (Eds.). *Proceedings of the New Zealand Tourism and Hospitality Research Conference 2004.* Wellington, 8-10 December, pp. 407-423.

Taylor, P. C. (1993). *The New Zealand recreation opportunity spectrum: Guidelines for users.* Wellington: Department of Conservation.

Todd, S. L., & Graefe, A. R. (1989). Level of experience and perception of conflict among canoeists of the Delaware Rivers. In More, T. A., Donnelly, M. P., Graefe, A. R., & Vaske, J. J. (Eds.) (Pp 147-156). *Proceedings of the 1989 Northeaster Recreation Research Symposium.* USDA Forest Service General Technical Report NE-132.

Tourism Industry Association of New Zealand (2005). www.tianz.org.nz (accessed 12/06/05)

Tyson, B. (1989). *Limits of Acceptable Change (LAC): An evaluation of the concept for introduction as a Department of Conservation resource planning technique*. Department of Conservation Internal Report. Wellington.

Vaske, J. J., Donnelly, M. P., & Heberlein, T. A. (1980). Perceptions of crowding and resource quality by early and more recent visitors. *Leisure Sciences, 3.* (4). 367-381.

Wray, K., Harbrow, M., & Kazmierow, B. (2005). Planning for visitor management at Mason Bay (Rakiura National Park, Stewart Island). *DOC Research and Development Series 222.* Wellington, Department of Conservation.

Statutes Cited

Conservation Act 1987

National Parks Act 1980

Personal Communications

Wray, K. (10 August, 2006). Co-author and researcher of: Wray, K., Harbrow, M., & Kazmierow, B. (2005). Planning for visitor management at Mason Bay (Rakiura National Park, Stewart Island). *DOC Research and Development Series 222.* Wellington, Department of Conservation.

Appendix 1: Stakeholder Interview Topic Guidelines

1) Describe your association with the Mingha-Deception track?

2) What is important to you about the Mingha-Deception track?

3) Are there any other reasons why you value the Mingha-Deception track?

4) Are there any issues related to visitor use for the Mingha-Deception track?

5) Do you have any concerns related to visitor use of the Mingha-Deception track?

Appendix 2: Stakeholder Interview Information Sheet*

Code:

INFORMATION FOR PARTICIPANTS

You are invited to participate in a project called *Managing for appropriate visitor use in protected natural areas: The application of the Limits of Acceptable Change planning framework to a case study of the Mingha-Deception track, Arthur's Pass National Park.* This research looks at visitor impact conditions for the Mingha-Deception track. One of the main aims of the project is to measure current impact conditions on the Mingha-Deception track and assess the acceptability of these conditions. Your participation in this research is voluntary and you must be 16 years or over to participate.

Your participation will involve an interview, which will be recorded on audiotape with your consent. You will also be mailed a questionnaire to complete and return (this will be mailed to you with a reply paid envelope in several weeks time). The results of this study will be used in the preparation of the researcher's master's thesis at Lincoln University. This information may be published but it will not identify any participants individually. The type of stakeholder you are (for example, tourism operator, resident) may be disclosed.

Data for this study will be collected from organisations and individuals with an interest in the Mingha-Deception track, along with visitors to the track, from November 2005 to March 2006.

This project is being carried out by Heather McKay, under the supervision of Dr Stephen Espiner and Kay Booth (contact details listed below). They will be pleased to discuss any concerns you might have about participation in this project. Should you, at some point in the next two weeks after completing the interview and returning the questionnaire, decide to withdraw your participation from this project, it is possible to contact the researcher or supervisors, and have the information you have given deleted from the data set. To do this, all you need is the four-digit code number from the top of this page. After this time, it will be understood that you have consented to participate in the project, and consent to publication of the results with the understanding that you will not be named individually but your stakeholder type may be identified.

Heather McKay	Stephen Espiner	Kay Booth
Masters thesis student	Supervisor	Associate Supervisor
Lincoln University	Lincoln University	Lincoln University
Telephone: 03 7323864	03 3252811 ext.8770	03 3252811 ext.8768
Email: dawberh@lincoln.ac.nz	espines@lincoln.ac.nz	boothk@lincoln.ac.nz

This project has been reviewed and approved by the Lincoln University Human Ethics Committee.

*This information sheet was printed on Lincoln University letterhead.

Appendix 3: Stakeholder Interview Consent Form

Code:

Consent Form

Managing for appropriate visitor use in protected natural areas: The application of the Limits of Acceptable Change planning framework to a case study of the Mingha-Deception track, Arthur's Pass National Park.

I have read and understood the description of this project. On this basis I agree to participate as a subject in the project, and I consent to publication of the results of the project with the understanding that I will not personally be named. I consent to the naming of my stakeholder type (e.g. Department of Conservation, tourism operator). I give permission for my interview to be recorded on audiotape. I understand also that I may withdraw from the project, including withdrawal of any information I have provided within two weeks of providing it.

Name:_____

Signed: _____ Date: _____

Appendix 4: Visitor Questionnaire

Code:

MINGHA-DECEPTION TRACK QUESTIONNAIRE

Part 1: General Information

1) When was your most recent trip on the Mingha-Deception track? (Please indicate specific dates where possible. If you are completing this survey while on the Mingha-Deception track, please consider this trip as your most recent trip)

.....

2) Did your most recent trip on the Mingha-Deception track involve any overnight stays on the track? (Please tick)

☐ Yes
☐ No (Go to Q3)

2A) Please indicate the number of nights stayed at each of the following locations:

Goat Pass Hut.....
Upper Deception Hut.....
Mingha Biv.....
Other.....Please indicate where.....

3) Which route did you take on your most recent trip on the Mingha-Deception track. (Please tick)

☐ Mingha-Goat Pass Hut-Deception
☐ Deception-Goat Pass Hut-Mingha
☐ Mingha-Goat Pass Hut-Mingha
☐ Deception-Goat Pass Hut-Deception
☐ Other - Please explain.....

4) What was the main activity you carried out on your most recent trip on the Mingha-Deception track. (Please tick)

☐ Tramping
☐ Running
☐ Hunting
☐ Climbing
☐ Other - Please explain.....

5) What activities have you **ever** undertaken on the Mingha-Deception track other than the activity specified in question 4? (Please tick as many as apply)

☐ Tramping
☐ Running
☐ Hunting
☐ Climbing
☐ Other - Please explain.....

6) How many times have you ever visited the Mingha-Deception track (including your most recent trip)? (Please tick)

☐ 1
☐ 2
☐ 3
☐ 4
☐ 5 – 9
☐ 10 +

7) How many people (including yourself) were there in your group on your most recent trip on the Mingha-Deception track? (Please tick)

☐ 1
☐ 2
☐ 3
☐ 4
☐ 5 – 9
☐ 10 +

Part 2: Social Conditions

Please answer the following questions in relation to your most recent trip to the Mingha-Deception track.

8) Did you feel crowded at any time on the Mingha-Deception track? (Please tick).

☐ Yes
☐ No (Go to Q9)

8A) Please indicate how crowded you felt at each of the following locations by circling the appropriate number.

A: In Goat Pass Hut ☐ I did not go to Goat Pass Hut (Go to B)

1	2	3	4	5	6	7	8	9
	Not at all Crowded		Slightly Crowded		Moderately Crowded		Extremely Crowded	

B: On the track/river bed

1	2	3	4	5	6	7	8	9
	Not at all Crowded		Slightly Crowded		Moderately Crowded		Extremely Crowded	

C: At the Mingha track end ☐ I did not go to the Mingha track end (Go to D)

1	2	3	4	5	6	7	8	9
Not at all Crowded			Slightly Crowded		Moderately Crowded		Extremely Crowded	

D: At the Deception track end ☐ I did not go to the Deception track end (Go to Q9)

1	2	3	4	5	6	7	8	9
Not at all Crowded			Slightly Crowded		Moderately Crowded		Extremely Crowded	

9) Has the behaviour of any other visitors on the Mingha-Deception track bothered you? (Please tick)

☐ Yes
☐ No (Go to Q10)

9A) What activity were the visitors whose behaviour bothered you undertaking? (Please tick)

☐ Tramping
☐ Running
☐ Hunting
☐ Climbing
☐ Other - Please explain.....

9B) Please comment on how their behaviour bothered you.
.....
.....
.....

10) Were you bothered by the presence of any **large groups** on the Mingha-Deception track? (Please tick)

☐ Yes
☐ No
☐ I didn't see any large groups

11) In your opinion how many people make up a large group? .....

12) Has the presence of people doing activities different to yours, ever put you off going to the Mingha-Deception track?

☐ Yes
☐ No (Go to Q13)

12A) Which activities put you off? (Please tick)

☐ Tramping
☐ Running
☐ Hunting
☐ Climbing
☐ Other - Please explain.....

12B) Please comment on how these activities put you off.

.....
.....
.....

13) Will the presence of people doing activities different to yours, ever put you off going to the Mingha-Deception track in the future?

☐ Yes
☐ No (Go to Q14)

13A) Which activities may put you off? (Please tick)

☐ Tramping
☐ Running
☐ Hunting
☐ Climbing
☐ Other - Please explain.....

13B) Please comment on how these activities may put you off.

.....
.....
.....

14) Which activities did you **expect** to see on the Mingha-Deception track? (Please tick)

☐ Tramping
☐ Running
☐ Hunting
☐ Climbing
☐ Other - Please explain.....

15) Which activities did you see on the Mingha-Deception track? (Please tick)

☐ Tramping
☐ Running
☐ Hunting
☐ Climbing
☐ Other - Please explain.....

Part 3: Track/Facilities Conditions

Please answer the following questions in relation to your most recent trip to the Mingha-Deception track.

16) Did you see evidence of vegetation damage which is caused by visitors walking/running off the formed track sections on the Mingha-Deception track? (Please tick)

☐ Yes
☐ No (Go to Q17)

16A) Did this vegetation damage bother you? (Please tick).

☐ No
☐ Yes it bothered me a little
☐ Yes it bothered me a lot

17) Did you see evidence of tracks being widened as a result of visitor use on the Mingha-Deception track? (Please tick)

☐ Yes
☐ No (Go to Q18)

17A) Did this widening bother you? (Please tick).

☐ No
☐ Yes it bothered me a little
☐ Yes it bothered me a lot

18) Did you see human toilet waste/toilet paper on or near the track or in other places it should not be on the Mingha-Deception track? (Please tick)

☐ Yes
☐ No (Go to Q19)

18A) Did this toilet waste bother you? (Please tick).

☐ No
☐ Yes it bothered me a little
☐ Yes it bothered me a lot

19) What is your opinion on the sections of formed track and boardwalk on the Mingha-Deception track? (Please tick)

☐ There need to be more sections of formed track and boardwalk
☐ There are currently sufficient sections of formed track and boardwalk
☐ There are currently too many sections of formed track and boardwalk
☐ No opinion

19A) Any comments on the standard of the sections of formed track and boardwalk?

.....
.....

20) What is your opinion on the directional signage (including track markers) on the Mingha-Deception track? (Please tick)

☐ There needs to be more directional signage
☐ There is currently sufficient directional signage
☐ There is currently too much directional signage
☐ No opinion

20A) Any comments on the standard of directional signage?

.....
.....

21) What is your opinion on the number of huts/bivouacs on the Mingha-Deception track? (Please tick)

☐ There need to be more huts/bivouacs
☐ There are currently sufficient huts/bivouacs
☐ There are currently too many huts/bivouacs
☐ No opinion

21A) Any comments on the standard of huts/bivouacs?

.....
.....

22) Are there sufficient toilets on the Mingha-Deception track (including at track ends)? (Please tick)

☐ Yes
☐ No

22A) Any comments on the standard of toilets?

.....
.....

Part 5: Profile Information

23) Are you: (Please tick)

☐ Male
☐ Female

24) What is your age? (Please tick)

☐ 16 – 19
☐ 20 – 29
☐ 30 – 39
☐ 40 – 49
☐ 50 – 59
☐ 60 +

25) Where are you from? (Please tick)

☐ New Zealand - Please state town/city/rural area.....
☐ Overseas - Please state country.....

26) What is your occupation?.....

27) What is your highest level of educational achievement? (Please tick one only)

☐ No qualification
☐ High School Qualification
☐ Tertiary or vocational certificate or diploma
☐ Bachelor's degree
☐ Post-graduate qualification

28) Please add any further comments about the points raised in this questionnaire.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

THANK YOU FOR YOUR PARTICIPATION

Please return this questionnaire directly to the researcher or return it in the enclosed reply paid envelope.

Appendix 5: Visitor Survey Information Sheet*

Code:

INFORMATION FOR PARTICIPANTS

You are invited to participate in a project called *Managing for appropriate visitor use in protected natural areas: The application of the Limits of Acceptable Change planning framework to a case study of the Mingha-Deception track, Arthur's Pass National Park.* This research looks at visitor impact conditions for the Mingha-Deception track. One of the main aims of the project is to measure current impact conditions on the Mingha-Deception track and assess the acceptability of these conditions. Your participation in this research will involve completing the attached questionnaire. The completion of this questionnaire will be taken as your consent to participate in the study. Your participation is voluntary and you must be 16 years or over to participate.

The results of this study will be used in the preparation of the researcher's master's thesis at Lincoln University. This information may be published but will not identify individual participants.

Data for this study will be collected from organisations and individuals with an interest in the Mingha-Deception track, along with visitors to the track, from November 2005 to March 2006.

This project is being carried out by Heather McKay, under the supervision of Dr Stephen Espiner and Kay Booth (contact details listed below). They will be pleased to discuss any concerns you might have about participation in this project. Should you, at some point in the next two weeks following completing and returning the questionnaire, decide to withdraw your participation from this project, it is possible to contact the researcher or supervisors, and have the information you have given deleted from the data set. To do this, all you need is the four-digit code from the top of this page. After this time, it will be understood that you have consented to participate in the project, and consent to publication of the results with the understanding that you will not be named.

Heather McKay	Stephen Espiner	Kay Booth
Masters thesis student	Supervisor	Associate Supervisor
Lincoln University	Lincoln University	Lincoln University
Telephone: 03 7323864	03 3252811 ext.8770	03 3252811 ext.8768
Email: dawberh@lincoln.ac.nz	espines@lincoln.ac.nz	boothk@lincoln.ac.nz

This project has been reviewed and approved by the Lincoln University Human Ethics Committee.

*This information sheet was printed on Lincoln University letterhead.

Appendix 6: Email to Newspapers, Magazines and Tramping Clubs

Dear Editor/Name*,

I am a Lincoln University master's student and am investigating visitor use and impacts on the Mingha-Deception track in Arthur's Pass National Park. I am seeking people who have tramped, run or walked the Mingha-Deception track in the past five years to participate in my research. Participation will involve completing a questionnaire regarding experiences on the track, and will take approximately 10-20 minutes to complete. People interested in taking part are invited to contact me by email at dawberh@lincoln.ac.nz or by writing to Heather McKay, Environment Society and Design Division, P O Box 84, Lincoln University, Canterbury. A questionnaire will then be mailed out with a reply paid envelope. The results of this research may be published but individual's names will not be used. Names and addresses will be used for the purposes of mailing this questionnaire only and then will be destroyed. Track user participation is vital to this research and the response of readers/club members* will be much appreciated.

Many thanks,

Heather McKay

*wording was changed to be appropriate for each publication/club the email was sent to.

Appendix 7: Stakeholder Survey Information Letter*

<Date>

Code:

<Name>
<Address>

Dear <Name>

You are invited to participate in research about the Mingha-Deception track in Arthur's Pass National Park. This research is being carried out as part of my master's thesis at Lincoln University. The research looks at visitor impact conditions for the Mingha-Deception track. One of the main aims of the project is to measure current impact conditions on the Mingha-Deception track and assess the acceptability of these conditions. To participate please complete the enclosed questionnaire and return it in the reply paid envelope. The completion of this questionnaire will be taken as your consent to participate in this study. Your participation in this research is voluntary and you must be 16 years or over to participate.

The results of this study will be used in the preparation of the researcher's master's thesis at Lincoln University. This information may be published but it will not identify any participants individually. The type of stakeholder you are (for example, tourism operator, resident) may be disclosed.

Data for this study will be collected from organisations and individuals with an interest in the Mingha-Deception track, along with visitors to the track, from November 2005 to March 2006.

This project is being carried out by Heather McKay, under the supervision of Dr Stephen Espiner and Kay Booth (contact details listed below). They will be pleased to discuss any concerns you might have about participation in this project. Should you, at some point in the next two weeks after completing and returning the questionnaire, decide to withdraw your participation from this project, it is possible to contact the researcher or supervisors, and have the information you have given deleted from the data set. To do this, all you need is the four-digit code number from the top of this page. After this time, it will be understood that you have consented to participate in the project, and consent to publication of the results with the understanding that you will not be named individually but your stakeholder type may be identified.

Heather McKay	Stephen Espiner	Kay Booth
Masters thesis student	Supervisor	Associate Supervisor
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Telephone: 03 7323864	03 3252811 ext.8770	03 3252811 ext.8768
Email: dawberh@lincoln.ac.nz	espines@lincoln.ac.nz	boothk@lincoln.ac.nz

This project has been reviewed and approved by the Lincoln University Human Ethics Committee.

Thank you for your participation,

Heather McKay

*This letter was printed on Lincoln University letterhead.

Code:

Appendix 8: Stakeholder Questionnaire

MINGHA-DECEPTION TRACK STAKEHOLDER QUESTIONNAIRE

Each of the scenarios below is related to visitor experience on the Mingha-Deception track. All questions relate to things visitors might experience on the Mingha-Deception track, and the acceptability of various conditions. A separate survey of visitor perceptions and experiences is being carried out in January and February, 2006. Information from the stakeholder questionnaire (that you are about to fill in) will identify the acceptability of various track experience conditions according to the range of people who have an interest in Arthur's Pass National Park. Across this group I will be able to analyse whether a group level of acceptability exists and then match this against the visitors' dataset, to identify whether visitor experience remains within acceptable levels. For example, if 20 percent of visitors feel crowded (identified from the visitor survey) and stakeholders collectively agree that it is very unacceptable for 10 percent of visitors to feel some degree of crowding, then this suggests a problem exists.

For each of the scenarios below please indicate how acceptable the scenario is by circling the appropriate number on the corresponding scale. Every scale ranges from -3 (very unacceptable), to 3 (very acceptable). The first scenario provides an example of how to indicate your acceptability rating.

Example Scenario: Please do not answer

Percentage of visitors inadequately prepared for weather conditions.

Preparedness of visitors	**very unacceptable**						**very acceptable**
10% of visitors inadequately prepared	-3	-2	-1	0	1	2	3
30% of visitors inadequately prepared	-3	-2	-1	0	1	2	3
50% of visitors inadequately prepared	-3	-2	-1	0	1	2	3
70% of visitors inadequately prepared	-3	-2	-1	0	1	2	3
90% of visitors inadequately prepared	-3	-2	-1	0	1	2	3

Please indicate your acceptability ratings for the following scenarios on the Mingha-Deception track: Please give acceptability ratings for each of the five scenarios in every box.

1) Visitors experiencing some degree of crowding during their visit to the track.

Crowding	**very unacceptable**						**very acceptable**
10% of visitors experience crowding	-3	-2	-1	0	1	2	3
30% of visitors experience crowding	-3	-2	-1	0	1	2	3
50% of visitors experience crowding	-3	-2	-1	0	1	2	3
70% of visitors experience crowding	-3	-2	-1	0	1	2	3
90% of visitors experience crowding	-3	-2	-1	0	1	2	3

2) Visitors experiencing conflict with other visitors during their visit to the track.

Conflict	**very unacceptable**						**very acceptable**
10% of visitors experiencing conflict	-3	-2	-1	0	1	2	3
30% of visitors experiencing conflict	-3	-2	-1	0	1	2	3
50% of visitors experiencing conflict	-3	-2	-1	0	1	2	3
70% of visitors experiencing conflict	-3	-2	-1	0	1	2	3
90% of visitors experiencing conflict	-3	-2	-1	0	1	2	3

3) Visitors being put off using the track owing to the presence of visitors undertaking activities different to their own.

Visitors being put off using track	**very unacceptable**						**very acceptable**
10% of visitors being put off	-3	-2	-1	0	1	2	3
30% of visitors being put off	-3	-2	-1	0	1	2	3
50% of visitors being put off	-3	-2	-1	0	1	2	3
70% of visitors being put off	-3	-2	-1	0	1	2	3
90% of visitors being put off	-3	-2	-1	0	1	2	3

4) Visitors who think there should be more stretches of formed track and boardwalk on the track.

Tracks and boardwalks	**very unacceptable**						**very acceptable**
10% of visitors think more track/boardwalk needed	-3	-2	-1	0	1	2	3
30% of visitors think more track/boardwalk needed	-3	-2	-1	0	1	2	3
50% of visitors think more track/boardwalk needed	-3	-2	-1	0	1	2	3
70% of visitors think more track/boardwalk needed	-3	-2	-1	0	1	2	3
90% of visitors think more track/boardwalk needed	-3	-2	-1	0	1	2	3

5) Visitors who think more directional signage (including track markers) is needed on the track.

Directional signage	**very unacceptable**						**very acceptable**
10% of visitors think more directional signage needed	-3	-2	-1	0	1	2	3
30% of visitors think more directional signage needed	-3	-2	-1	0	1	2	3
50% of visitors think more directional signage needed	-3	-2	-1	0	1	2	3
70% of visitors think more directional signage needed	-3	-2	-1	0	1	2	3
90% of visitors think more directional signage needed	-3	-2	-1	0	1	2	3

6) Visitors who think more huts and bivouacs are needed on the track.

Huts and bivouacs	**very unacceptable**						**very acceptable**
10% of visitors think more huts/bivouacs needed	-3	-2	-1	0	1	2	3
30% of visitors think more huts/bivouacs needed	-3	-2	-1	0	1	2	3
50% of visitors think more huts/bivouacs needed	-3	-2	-1	0	1	2	3
70% of visitors think more huts/bivouacs needed	-3	-2	-1	0	1	2	3
90% of visitors think more huts/bivouacs needed	-3	-2	-1	0	1	2	3

7) Visitors who think there are insufficient toilets on the track (including at track ends).

Toilets	**very unacceptable**						**very acceptable**
10% of visitors think toilets are insufficient	-3	-2	-1	0	1	2	3
30% of visitors think toilets are insufficient	-3	-2	-1	0	1	2	3
50% of visitors think toilets are insufficient	-3	-2	-1	0	1	2	3
70% of visitors think toilets are insufficient	-3	-2	-1	0	1	2	3
90% of visitors think toilets are insufficient	-3	-2	-1	0	1	2	3

8) Visitors who comment negatively on the standard of tracks and facilities.

Comments on standard	**very unacceptable**						**very acceptable**
10% of visitors comment negatively	-3	-2	-1	0	1	2	3
30% of visitors comment negatively	-3	-2	-1	0	1	2	3
50% of visitors comment negatively	-3	-2	-1	0	1	2	3
70% of visitors comment negatively	-3	-2	-1	0	1	2	3
90% of visitors comment negatively	-3	-2	-1	0	1	2	3

9) Visitors who are bothered by evidence of vegetation damage caused by visitors walking/running off developed tracks.

Visitors bothered by vegetation damage	**very unacceptable**						**very acceptable**
10% of visitors bothered	-3	-2	-1	0	1	2	3
30% of visitors bothered	-3	-2	-1	0	1	2	3
50% of visitors bothered	-3	-2	-1	0	1	2	3
70% of visitors bothered	-3	-2	-1	0	1	2	3
90% of visitors bothered	-3	-2	-1	0	1	2	3

10) Visitors who are bothered by track widening, which is due to visitor use.

Visitors bothered by track widening	**very unacceptable**						**very acceptable**
10% of visitors bothered	-3	-2	-1	0	1	2	3
30% of visitors bothered	-3	-2	-1	0	1	2	3
50% of visitors bothered	-3	-2	-1	0	1	2	3
70% of visitors bothered	-3	-2	-1	0	1	2	3
90% of visitors bothered	-3	-2	-1	0	1	2	3

11) Visitors who are bothered by evidence of human waste/toilet paper on or near the track, or in other places it shouldn't be.

Visitors bothered by toilet waste	**very unacceptable**						**very acceptable**
10% of visitors bothered	-3	-2	-1	0	1	2	3
30% of visitors bothered	-3	-2	-1	0	1	2	3
50% of visitors bothered	-3	-2	-1	0	1	2	3
70% of visitors bothered	-3	-2	-1	0	1	2	3
90% of visitors bothered	-3	-2	-1	0	1	2	3

12) How are you (or the organisation/group you represent) associated with the Mingha-Deception track? (Please tick as many as apply)

- ☐ Track user: tramper
- ☐ Track user: runner
- ☐ Track user: hunter
- ☐ Track user: climber
- ☐ Track user: other - Please explain.....
- ☐ Concessionaire
- ☐ Department of Conservation
- ☐ Local/Regional Council
- ☐ Iwi
- ☐ Arthur's Pass area accommodation provider
- ☐ Other Arthur's Pass area business
- ☐ Arthur's Pass area resident
- ☐ Arthur's Pass area bach holder
- ☐ Tramping/outdoors club
- ☐ Other - Please explain.....

13) Please add any comments you would like to make about the issues raised in this questionnaire.

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THANK YOU FOR YOUR PARTICIPATION

Please return this questionnaire in the reply paid envelope provided